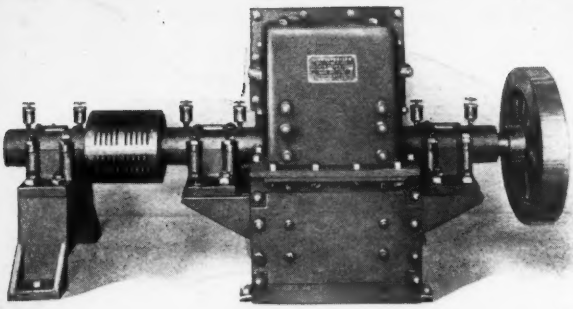
...it and Quarry

...GRAVEL ▪ STONE

...NDLING ▪ CRUSHING ▪ SCREENING ▪ WASHING



By the Very Nature of the Work

it is called upon to perform a pulverizer must be much stronger than the material it handles.

Only STEEL will stand the stress

"K-B"

Is Built All-Steel

Catalog on request

K-B PULVERIZER

K-B PULVERIZER COMPANY, Inc.

92 Lafayette Street, New York

JULY, 1920

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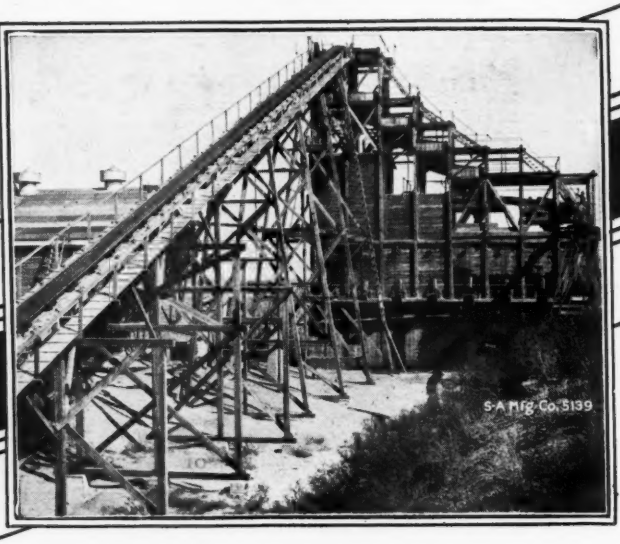
SPECIFY S-A CONVEYORS



Highly Important Feature

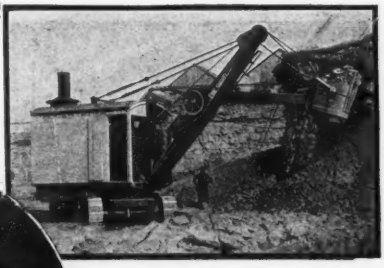
The means whereby the aggregate is transferred to the washing and screening plant is most important. No better method is available than the belt conveyor. Steadily and continuously the belt conveyor delivers material in a uniform flow to the screens.

S-A belt conveyors are particularly desirable for this service. They are thoroughly reliable and require minimum attention.

If you contemplate building a new plant or if you anticipate changes or extensions to your present equipment, communicate with S-A engineers.

STEPHENS-ADAMSON MFG. CO.
AURORA, ILLINOIS

AURORA S-A MFG. CO ILLINOIS



ERIE Steam Shovel owned by Tarbox & McCall, Findlay, O.

"442 tons a day. It replaces 22 men!"

"Our ERIE Shovel has loaded as high as 442 tons of lime rock, actual weight, per day of nine hours. It can give us as much as 500 or 600 cu. yds. in 10 hours. The best we could average when loading stone by hand was 20 tons to the man, so the ERIE easily takes the place of 22 men.

"No one can make any mistake in buying an ERIE Shovel."—*TARBOX & McCALL, Crushed Stone, Findlay, Ohio.*

The ERIE is strongly built, and works steadily in rock. It is both speedy and RELIABLE.

We would like to send you a bulletin showing just what the ERIE Shovel can do.

Write for a copy of Bulletin Q. Address

BALL ENGINE CO., Erie, Pa.
Builders of ERIE Steam Shovels and Locomotive Cranes.

Serves either as a Steam-Shovel or as a Locomotive Crane (with Clamshell Bucket)

ERIE Revolving Shovels BALL Engine Co. Erie, Pa.

You Will Wonder—

After you have installed the self-rotating Hardsocg Wonder Drills you will surely wonder how you ever got along without them before. For no quarry or mine can afford to be without them.

Hardsocg Wonder Drills

permit faster drilling with less power and a minimum of upkeep. They can be operated either by compressed air or steam. One lever handle valve controls use of live air or steam. Piston hammer is not subject to breakage in operation; does not strike front end. Consumes very little air. Has very few parts. Skilled labor unnecessary.

Features:

Self-rotating	Full rubber handle
Shock absorber	Exhaust control
Few parts	Automatic oiler

Bit retainer gives perfect satisfaction. Works on protected spiral compression spring—unbreakable.

Write for Our Catalog

Hardsocg Wonder Drill Co.
Ottumwa, Iowa

Little Giant Road Crane

THE SEASON IS ON

If you can handle your product rapidly and efficiently, you can take care of more contracts. Increase your business without increasing your overhead.

A LITTLE GIANT ROAD CRANE will handle in bulk more efficiently and more rapidly than any machine of a similar design, with a lower cost for maintenance and operation. Consequently, you should investigate the Little Giant Road Crane.

Address Dept. "C"

The Locomotive Crane Company
OF AMERICA
CHAMPAIGN · ILLINOIS

Where Endurance Means Economy

You men who operate sand and gravel handling equipment know what your wire rope has to contend with. Loads are heavy, bends are often sharp, and there is lots of wear.

You also know that when your wire rope fails your work stops. In fact the efficiency of your entire equipment depends upon your wire rope.

The unusual endurance and wear resisting ability of Hercules (Red-Strand) Wire Rope enable it to withstand a lot of hard service. It is a dependable rope because its every wire is rigidly examined and tested. Because of its uniform durability it will save you both time and money.

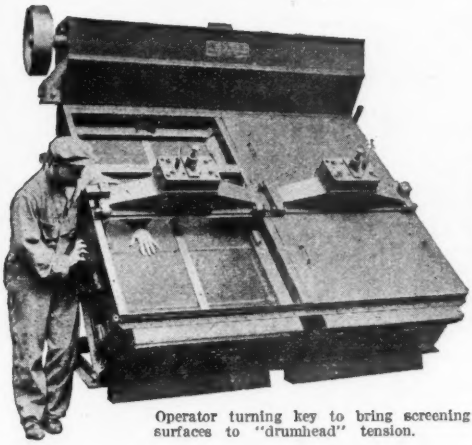
63 years in business

A. Leschen & Sons Rope Company

St. Louis, Mo.

New York Chicago Denver San Francisco

A. LESCHEN & SONS ROPE CO. ESTABLISHED 1857 "HERCULES" (RED STRAND) WIRE ROPE ST. LOUIS, U.S.A.



Operator turning key to bring screening surfaces to "drumhead" tension.

HUM-MER SEPARATOR

For screening Silica, Limestone, Gravel, Cement and other Rock Products

Large Tonnage and Close Separation with Mechanical Simplicity

The fundamental reasons for purchasing the HUM-MER Separator Screen are its immense tonnage-capacity and close separation.

Other features of great value to the user are its mechanical simplicity and positive action.

NO LUBRICATION

The vibrating mechanism of the HUM-MER requires absolutely no lubrication.

NO CAMS, HAMMERS OR ECCENTRICS

Complicated, troublesome mechanical construction is eliminated in the HUM-MER; there are no cams, hammers or eccentrics used anywhere in the separator.

USED CONTINUOUSLY IN ROCK PRODUCTS INDUSTRY

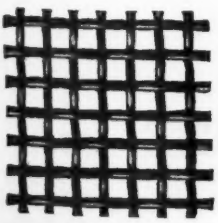
HUM-MER Separators are being used for screening limestone, silica, cement, phosphate rock, etc., and are giving continuous service under all conditions.

Write for further particulars

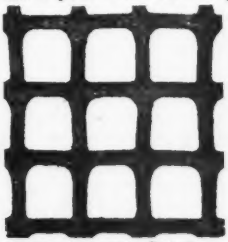
THE W. S. TYLER COMPANY

Manufacturers of Woven Wire Screens **Cleveland, Ohio**

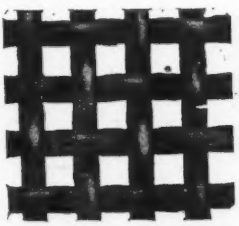
Write us about your wire cloth requirements.



6 Mesh, .054 Steel



3 Mesh, .080 Galvd.



3½ Mesh, .135 Steel

More Work in Less Time

Shay locomotives do more work in less time than rod engines.

They start instantly, without the need of "taking slack."

They spot cars acurately because of their multi-cylinder engines and gear drive.

They pull with an even steady pull like that of an electric motor—avoiding damage to equipment.

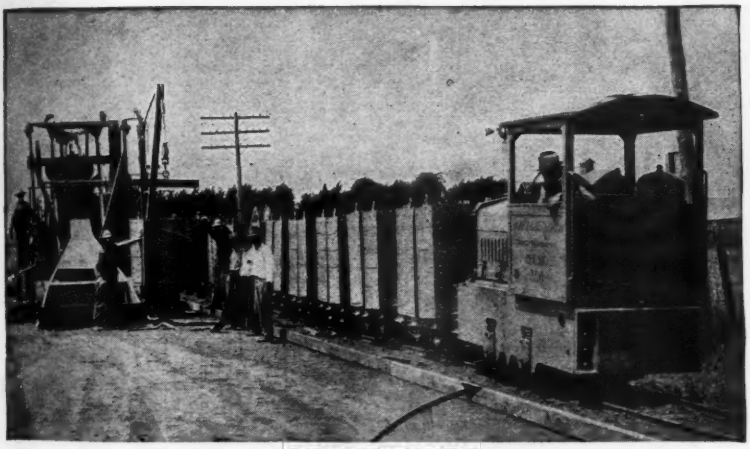
Shays mean increased production.

LIMA LOCOMOTIVE WORKS, Inc.

Lima, Ohio **30 Church St., New York**

WHITCOMB LOCOMOTIVES

ALL SIZES
FOR ALL CONDITIONS
POSITIVE GEAR AND FRICTION DRIVE
GASOLINE AND STORAGE BATTERY



SIX TON

3-Speed Positive Drive

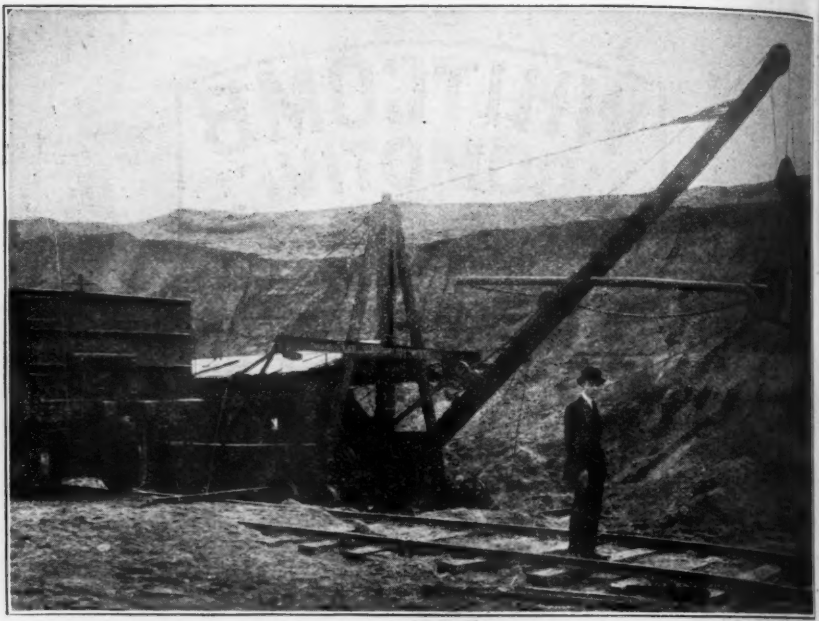
Road Contractors Special

This Six-Ton Gasoline Locomotive Will High Ball More Material to the Mixer Than Any Other Gasoline Locomotive Built of Its Weight.

Gasoline Locomotives, 2½ to 25 Tons. Storage Battery Locomotives, 2 to 8 Tons on Drivewheels.

GEO. D. WHITCOMB CO.

ROCHELLE ILLINOIS



"Very Satisfactory"

is what Holbrook & Skinner say of

The BAY CITY LOADER

For Pit and Quarry Service

This machine is in operation loading gravel at their plant in Lansing, Mich. It is rendering excellent service and Mr. Skinner most willingly said so.

The BAY CITY Loader operates a powerful digging bucket that takes a big load at every bite. Handles a large amount of material at very low cost. Can be used for stripping, grading and loading sand, gravel or clay from bank into cars or wagons. Operating and upkeep costs small.

Write for full description.

BAY CITY DREDGE WORKS

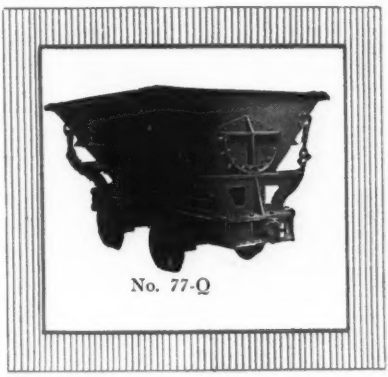
BAY CITY - - - - MICH.

Conditions May ..... Cars May But We Don't Differ-

No. 145-Q

at any time from high standards of excellence in car construction and a consistent policy of rendering satisfaction to purchasers of our equipment.

Ours is one of the largest car-building plants of its kind in the world and we can meet your need with dependable, long-lasting haulage cars of a type best suited to your particular kind of work.



No. 77-Q

Simply state your haulage problem. We'll help you solve it.

The Watt Mining Car Wheel Co.

Barnesville, Ohio

Denver:
Lindrooth, Shubart & Co.
Boston Bldg.

San Francisco:
N. D. Phelps
Sheldon Bldg.

Philadelphia:
Edelen & Co.
235 Commercial Trust Bldg.

Watt Cars

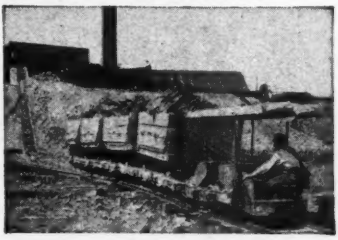
The Valve Bag is the approved container for hydrated lime and many other loose materials because it is filled rapidly to desired weight, seals itself—and it *contains*. No dust from filling, no strings to come undone, no ears to pull off. Makes a neat, shapely package that is easily handled and that stacks close.

If you use Valve Bags, let us figure on your next order. If you don't use Valve Bags, let us show you the efficiency and economy of our packing system.

THE VALVE BAG COMPANY OF AMERICA

Toledo, Ohio

How Do You Move Your Cars?



Do you know what it is costing you to move your materials by your present methods?

—Figure it carefully

Do you know what savings can be made by a correctly applied system of electrical haulage?

—We will show you

Do you know the safety, speed, economy and high capacity of a good electric haulage system?

—We can tell you

Wouldn't you like a thorough analysis of your conditions, to see how they may be improved?

—We will make it

Wouldn't you like expert engineering advice as to selection of just the right equipment?

—Yours without obligation

Do you know that there is available to you from our varied line an exactly suitable system?

—Let us prove it

Do you know how our Service follows our every installation, to assure you perfect satisfaction?

—It's an important point

Wouldn't you like to see something of our complete line as shown in our Industrial Bulletin?

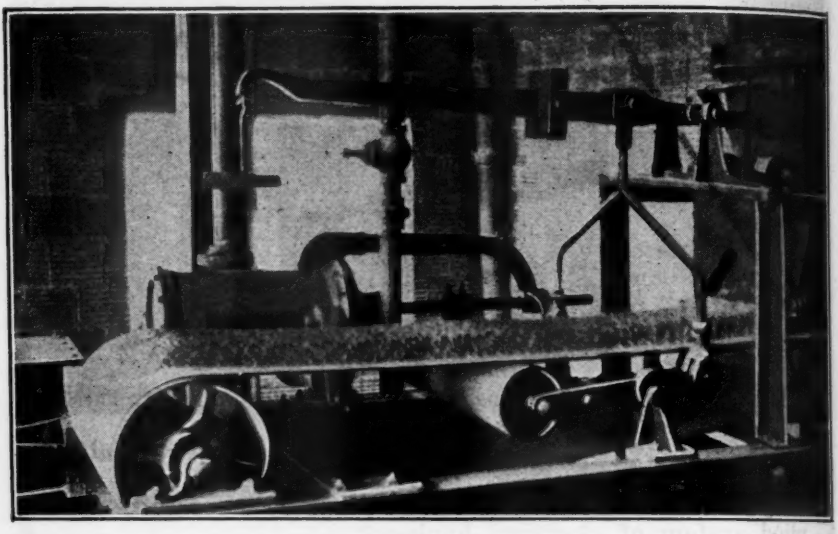
—Ask for Book No. 201-Q

GOODMAN MANUFACTURING CO.

48th to 49th Streets, on Halsted

Chicago, Illinois

(85)



Successful Cement Manufacturers Use The SCHAFFER Poidometer

BECAUSE

It handles materials AUTOMATICALLY, doing the work of correctly proportioning by weight; adding proper proportions of liquid in wet process; operating with 99.50 per cent accuracy; keeps tab on production and wastage.

This outfit will handle a wide variety of materials, such as ground quick lime, limestone, hydrate lime, ground shales, coal, coke, ores, sawdust, zinc, fire clays, manganese, litharge, white lead, etc.

Can you afford to be without one?

The Schaffer Engineering & Equipment Co.

Peoples Bank Building **Pittsburgh, Pa.**

VULCAN Rotary Kilns help produce superior lime

More and more lime is being burned in rotary kilns instead of in vertical kilns. Not only is the manufacturing cost greatly reduced, because of the greater fuel efficiency and lower labor charge, but the lime is of much superior quality.

It is thoroughly and uniformly burned.

Lime produced in a **rotary kiln** will stand storage better than the product of the old type vertical kiln.

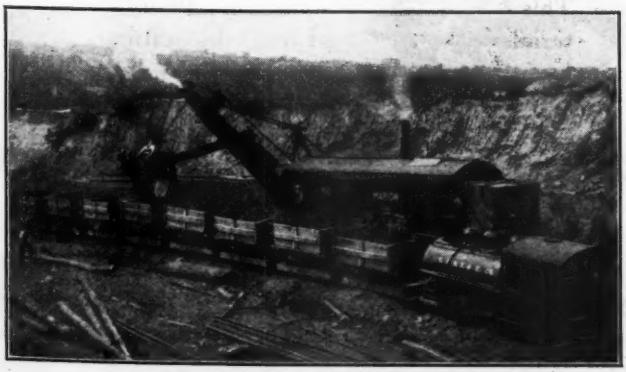
Lime bearing rock and earth which cannot be burned in stationary kilns, can be treated economically in a rotary kiln. Finely divided rock, crumbly limestone, dry or wet marls may be burned in VULCAN Rotary Kilns.

Correspondence Invited.

VULCAN IRON WORKS

Designers and Builders of Rotary Kilns for 26 Years.

1754 Main St. **Wilkes-Barre, Pa.**
New York **Chicago**

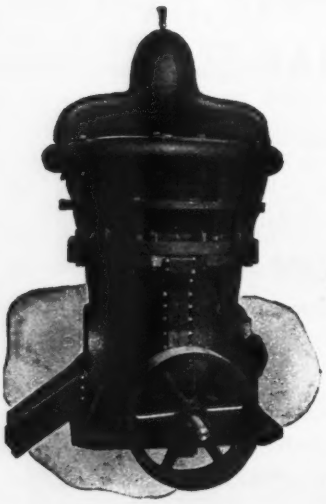


GATES TYPE "K"

Gyratory Crusher

Easily the first machine in every field, whether quarry, mine or mill.

Years of practical operation under every conceivable condition backed by fundamentally correct design have made the Allis-Chalmers Gates Type K the standard of the world.



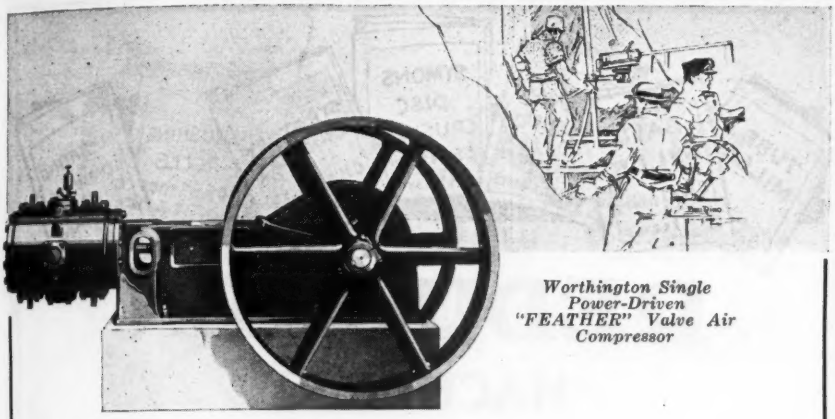
Send for descriptive bulletin.

Our name is your assurance

Offices in all principal cities.

ALLIS-CHALMERS

Milwaukee. Wis.. U. S. A.



Worthington Single Power-Driven "FEATHER" Valve Air Compressor

The "FEATHER" Valve

(REG. U. S. PAT OFF.)

Compels Dependable Air Service

AIR Compressors and Compressed Air Services have been rendered sure, safe and reliable by Worthington "FEATHER" Valve. This valve has but one moving part, weighs less than one ounce and functions without friction or hammering action. It is a strip of ribbon steel—strong and long lasting—that seats tightly on ground face slotted seats and allows air or gas to pass by bowing against slotted curved guards, the ends remaining in contact on seat at all times.

All Worthington Air Compressors are "FEATHER" Valve equipped, and are built by Worthington, whose service has attained world dimensions through 80 years' building, designing and improving Pumps and Pumping Machinery for all uses and purposes.

WORTHINGTON PUMP AND MACHINERY CORPORATION

Executive Offices: 115 Broadway, New York City

Branch Offices in 24 Large Cities

Other Worthington Products

Gyratory Crushers, Jaw Crushers, Air Compressors, Mine Pumps, Revolving Stone Screens, Ball and Tube Mills.

PUMPS—COMPRESSORS—CONDENSERS—OIL & GAS ENGINES—METERS—MINING—ROCK CRUSHING & CEMENT MACHINERY

WORTHINGTON

Dunne Works, *Holyoke, Mass.*
Blake & Knowles Works
East Cambridge, Mass.
Worthington Works
Harrison, N. J.
Laidlaw Works, *Cincinnati, Ohio.*

Hazleton Works, *Hazleton, Pa.*

Gas Engine Works, *Cudahy, Wis.*
Power & Mining Works
Cudahy, Wis.
Snow-Holly Works
Buffalo, N. Y.
Epping-Carpenter, *Pittsburgh, Pa.*

REDUCTION MACHINERY

Gyratory and Jaw Crushers for Initial Breakers.

Symons Horizontal Disc Crushers as Intermediate Breakers.

Symons Vertical Disc Crushers as Intermediate or Finishing Crushers.

Ball Mills and Tube Mills for Finish Grinding

Crushing Rolls as Intermediate Crushers.

Pulsating and Revolving Screens.

Whether it be one machine or a complete plant we want the opportunity of figuring with you.

Our engineers are at your service in the design of your plant and are in a position to go into the smallest detail of the arrangement of your reduction equipment.

Our Machinery Now In Use In

Vermont
Connecticut
Massachusetts
New York
Pennsylvania

New Jersey
Maryland
Ohio
Indiana
Illinois

Michigan
Wisconsin
Rhode Island
Virginia
Kentucky

Tennessee
Alabama
Florida
Arkansas
Missouri

Iowa
Minnesota
North Dakota
South Dakota
Nebraska

Kansas
Oklahoma
Texas
New Mexico
Colorado

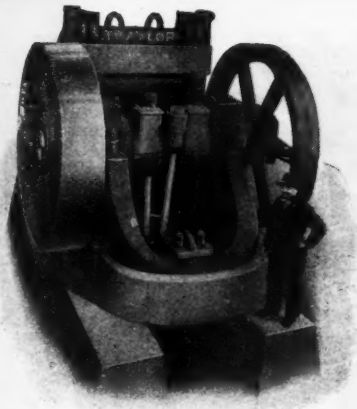
Montana
Idaho
Utah
Arizona
California

Nevada
Oregon
Washington

CHALMERS & WILLIAMS

Main Office, 1430 Arnold Street, Chicago Heights, Illinois

Chicago Office, 208 S. La Salle St.



Look Your Jaw Crusher In The Back!

If it's a

Traylor "Bulldog"

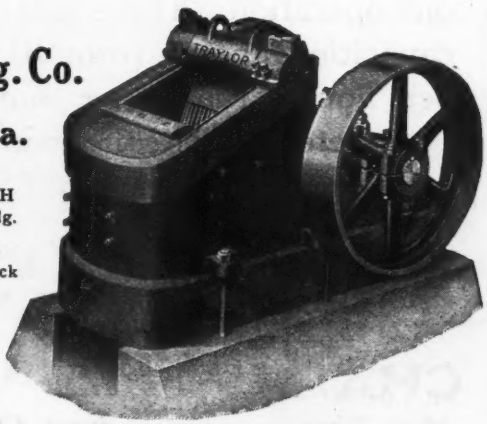
You'll see what's going on inside—what it is that eliminates 80% of the friction load and makes the "Bulldogs" the strongest, most economical, and most reliable jaw crushers on the market.

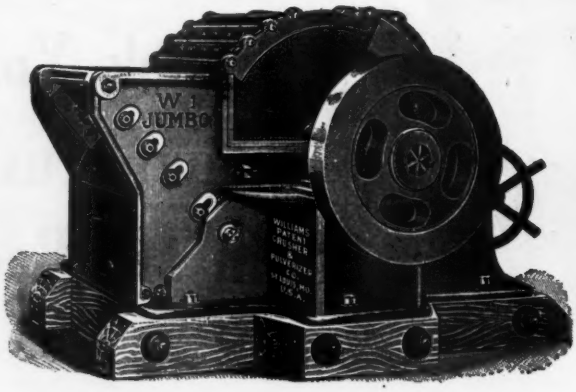
A lighter but far stronger pitman—a frictionless, self-aligning toggle system—a steel-banded frame of unequalled strength—these and other economy-producing "Bulldog" features are fully described in Bulletin QJX-1. Send for it.

Traylor Eng. & Mfg. Co.

Allentown, Pa.

NEW YORK 30 Church St.
PITTSBURGH 211 Fulton Bldg.
CHICAGO 1414 Fisher Bldg.
SPOKANE Mohawk Block
LOS ANGELES Citizens Bank Bldg.





WILLIAMS JUMBO CRUSHERS

Williams Jumbo Crushers are used in quarries as secondary crushers, taking 10-inch and under limestone, as it comes from the primary crushers, and reducing the material to 1½-inch, 1¼-inch or 1-inch and under in one operation. These machines are built in capacities ranging from 30 tons to 300 tons per hour. Many are now in operation. Complete details concerning these crushers are found in bulletin No. 85-A.

The Williams Patent Crusher & Pulverizer Company
General Sales Dept., 37 W. Van Buren St.,
CHICAGO

Plant
ST. LOUIS

67 Second St.
SAN FRANCISCO

TELSMITH—

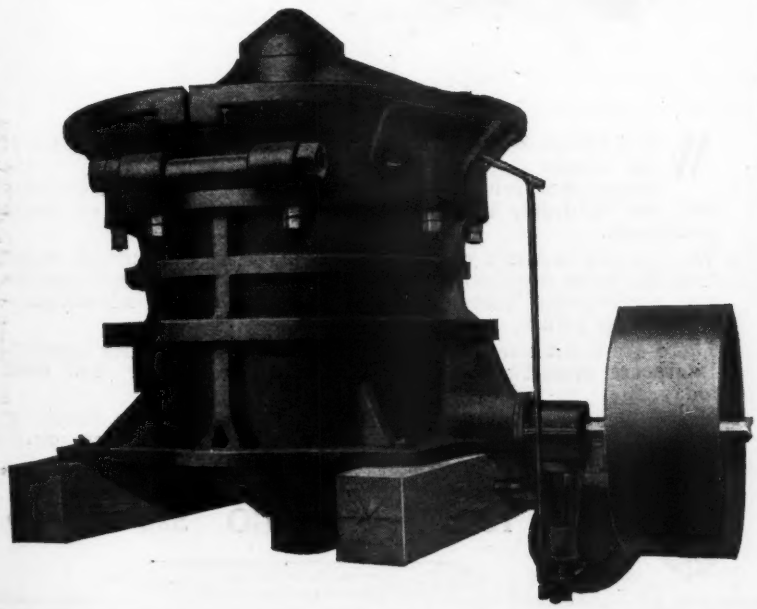
CUTS DOWN QUARRY LABOR

The Telsmith Primary Breaker exerts the full stroke on the big lumps just as they enter the bowl. The initial bite is a long, horizontal, bull-dog grip that doesn't let go. It just fairly eats into the rock, increasing the capacity and reducing the labor over the crusher.. But Telsmith's big feed area is still more important from a labor-saving stand-point. While the width of the opening is the same as in other gyratory crushers, in every other dimension of the concave bowl and crushing cone *Telsmith is 25-35 per cent bigger than other crushers.* Don't take our word for it, but measure up the machines. When you have done that, you'll not be surprised to find Telsmith doing such splendid work for E. J. Lavino & Co., Philadelphia, Pa; Hilder Granite Co., St Cloud, Minn.; Charles Warner Co., Wilmington, Del.; United Railways Co., St. Louis, Mo.; Storey Rock Co., Bozeman, Mont.; Thomas Iron Co., Wharton, N. J.; Defrain Sand Co., Philadelphia, Pa.; Thomasville Stone & Lime Co., Thomasville, Pa.; Webster Stone Co., Irvington, Ky.; Federal Lead Co., Flat River, Mo., and a host of other plants.

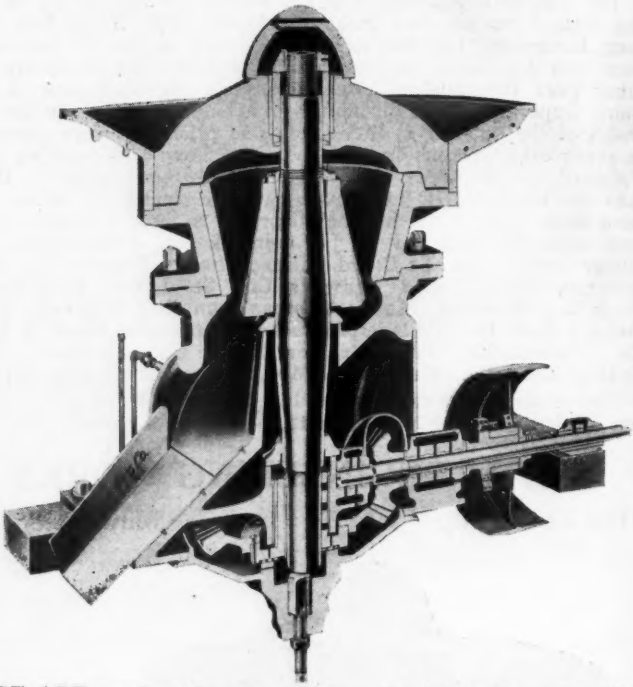
Glad to send your catalog No. 161 (Telsmith Primary Breaker) and Bulletin No. 2F15 (Telsmith Reduction Crusher).

SMITH ENGINEERING WORKS

3183 Locust St., Milwaukee, Wis.



An Inside View
Invites Your Study



WE ARE anxious for you to know the internal construction of the Austin Gyratory Crusher. The more you study it, the deeper you probe into the details of design, the more certainly will you be deeply convinced of the great advantages of Austin equipment.

We ask you to study and learn these advantages yourself, rather than for us to explain them to you. For Austin Gyratory features are performance features—substantial mechanical advantages—not talking points.

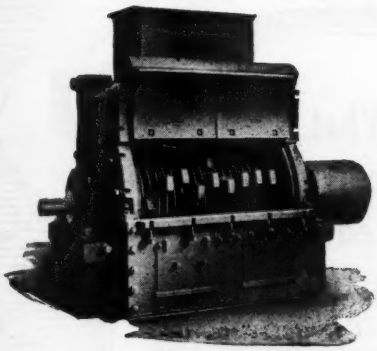
There are eight sizes ranging from 5 to 500 tons hourly capacity. Literature describing each model in detail ready for you. Send today.

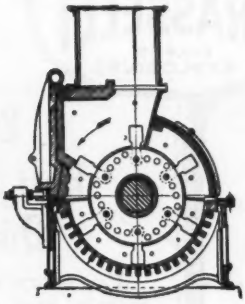
Austin Quarry and Gravel Pit Equipment also includes Revolving Screens, Belt and Chain Elevators, Quarry Cars and Hoists, etc.

Austin Manufacturing Company

New York CHICAGO San Francisco

ALLIED — ALLIED CONSTRUCTION MACHINERY CORPORATION — ALLIED
120 Broadway New York, U.S.A.





Jeffrey

TYPE "B" Ball Bearing Swing Hammer Pulverizer

for Breakdown of Large Pieces of Limestone, Gypsum, Shale, etc.

Leading Cement Mills, Lime Plants, Quarries, Gypsum Plants, etc., are being equipped with Jeffrey Swing Hammer Pulverizers to meet the constantly increasing demand.

Write for Pulverizer Catalog No. 147-K

The Jeffrey Mfg. Co. 990 North Fourth St. **Columbus, O.**

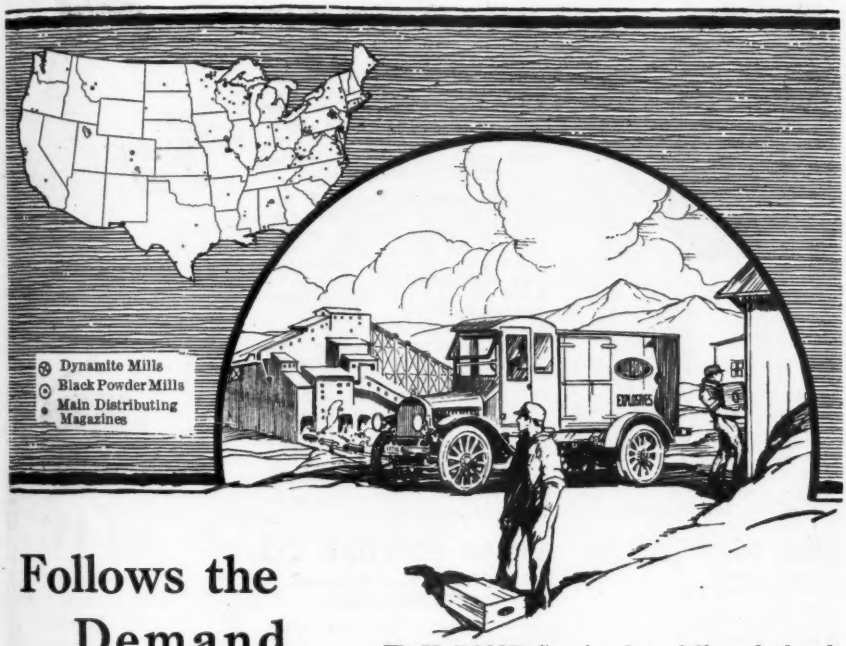
BRANCHES:
New York, Philadelphia, Pittsburgh, St. Louis, Dallas, Scranton, Montreal, Boston, Cleveland, Chicago, Birmingham, Milwaukee, Denver, Detroit, Buffalo, Los Angeles

Manufacturers of Pulverizing, Conveying and Elevating Machinery; Chains; Self-Propelling Loaders; Electric Trolley and Storage Battery Locomotives, etc.

Handle it Mechanically

CHEMICALS
SPELTER
GRASSELLI
COLORS
EXPLOSIVES
What
Explosive Is
Best Suited to Your
Quarry Needs?
For every type of quarry, there is a certain kind or combination of explosive which, in the proper quantity and with proper spacing and drilling, will cut your blasting costs by producing more efficiently.
But to determine the grade and strength best adapted to your quarry requires the most careful study.
The kind of rock you are quarrying, the size and shape to which you desire it reduced, the lay of the rock itself, the condition of the face after blasting—these are but a few of the things to be taken into consideration.
There is a grade or combination of grades of GRASSELLI explosives particularly adapted to your quarry
Why not let us arrange to have one of our blasting experts—everyone of whom is a practical quarryman—go over your proposition with you? A letter or wire from any point east of the Mississippi will bring one of them to you.
The Grasselli Powder Company
Cleveland, Ohio.
ESTABLISHED 1839
GRASSELLI
EXPLOSIVES
HOMER

Du Pont Explosives Service —*Everywhere*



Follows the Demand Today—

DU PONT Service has followed the demand into every nook and by-way. Today, fleets of specially designed motor trucks feed the mines in many of the great coal and ore districts, just as the grocer delivers foodstuffs to the home. Twenty-four mills and hundreds of magazines, strategically located throughout the country, form the center of these radiating lines of service.

Du Pont Explosives Service has brought about better and more economical explosives, delivered *when* and *where* you want them—and close cooperation to the end that they are used more efficiently.

During the 118 years of this Company's existence, this Service has grown in its scope and value, aiding production and construction everywhere. It has been a distinct factor in the building of America. It stands today as a real achievement. It is yours for the asking.

Ask your dealer—or write us.

E. I. du Pont de Nemours & Company, Inc.

Sales Dept.: Explosives Division
WILMINGTON, DELAWARE

DU PONT

Blasting Supplies

that are dependable

In all work calling for the use of explosives, it is extremely important that the accessories known as Blasting Supplies shall be of the very highest quality. Defective or weak detonating devices often imperil both life and property—and result in a loss of explosive energy, if no more.

In the manufacture of Atlas Blasting Supplies the most scrupulous care is exercised to make them thoroughly practical, effective and RELIABLE. The ATLAS name on detonators, galvanometers, rheostats, blasting machines and other blasting supplies signifies that they are as safe and sure as it is possible for experience and manufacturing skill to make them.

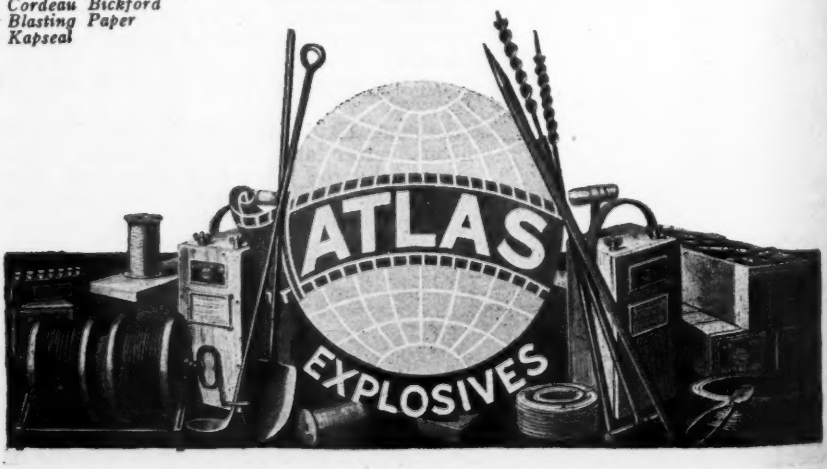
Our Service Division will gladly confer with you as to what detonating supplies will give you the most economical service.

Blasting Caps
Blasting Machines
U. S. Standard
Little Giant
Mason Turbine
Cap Crimpers
Delay Action Exploders
Delay Electric Blasting Caps
Delay Electric Igniters
Electric Blasting Caps
Electric Squibs
Galvanometers
Leading Wire
Connecting Wire
Miners' Squibs
Rheostats
Safety Fuse
Tamping Bags
Thawing Kettles
Portable Magazines
Stationary Magazines
Cordeau Bickford
Blasting Paper
Kapseal

ATLAS POWDER CO.

140 North Broad Street
PHILADELPHIA

Branch Offices: Allentown, Pa.; Birmingham, Ala.; Boston; Chicago; Des Moines, Ia.; Houghton, Mich.; Joplin, Mo.; Kansas City; Knoxville; McAlester, Okla.; Memphis; Nashville; New Orleans; New York; Philadelphia; Pittsburg, Kans.; Pittsburgh, Pa.; Pottsville, Pa.; St. Louis; Wilkes-Barre.



The Quarryman and Hercules Dynamite

The experienced quarryman uses explosives with the greatest skill. He has carefully studied the blasting conditions of his quarry. He knows how to properly space, drill, and charge the holes in order to get the best results from a shot.

But when the fuse is lighted or the contact made in the blasting machine—*it is up to the powder to do the work.* No matter how skillfully the quarryman does his part of the work, his results depend upon whether or not his explosives make good.

Hercules Explosives *do* make good. The strongest evidence of this is our large and rapidly growing business with the quarrymen of the United States. These men recognize the value of using powders of high and uniform quality.

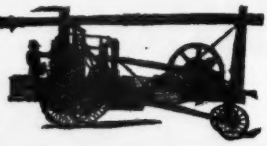
Use Hercules dynamite in your quarry. This will help you to increase production and cut costs.

HERCULES DYNAMITE

HERCULES POWDER CO.

Chicago	St. Louis	New York
Pittsburg, Kan.	Denver	Hazleton, Pa.
San Francisco	Salt Lake City	Joplin
Chattanooga	Pittsburgh, Pa.	Wilmington, Del.

THE CLIPPER



BLAST HOLE DRILL

The fact that the "CLIPPER" BLAST HOLE DRILL is used by the largest and best buyers of such machinery in the world is better proof of superiority than all the "big claim" advertisements that can be written in a month!

Among our hundreds of large customers, many of whom have bought from TEN to SEVENTEEN machines from us, we are proud to name the following:

If all these big concerns use the "CLIPPER" why not You?

Kelley Island Lime & Transport Co.
Mich. Limestone & Chemical Co.
Michigan Alkali Co.
France Stone Co.
Brownell Improvement Co.
Standard Lime & Stone Co.
Solvay Process Co.
Bethlehem Steel Co.
Jones & Laughlin Steel Co.
Lackawanna Steel Co.
Blair Limestone Co.
The Lehigh, The Alpha, The Atlas
The Alsen, The Coplay, The Vulcanite
The Whitehall, The LaSalle, and
The South-Western Portland Cement Companies
General Crushed Stone Co.
Tomkins Cove Stone Co.
Bessemer Limestone Co.
National Lime & Stone Co.
Greenville Stone & Gravel Co.
Lee Lime Co.
Ladd Lime & Stone Co.
A. T. Small Quarries Co.
W. W. Boxley Co.
Canada Cement Co.
Cornwall Ore Bank Co.
Connecticut Lime Co.
Dominion Mines & Quarries Co.
Ford Plate Glass Co.
Owens-Bottle Machine Co.
Toledo Stone & Glass Sand Co.
Derry Glass Sand Co.
Wayne Coal Co.
Adena Coal Co.
Danville Brick Co.
Lake Shore Shale Brick Co.

And hundreds of others of greater or less magnitude.

They are made for Steam, Gasoline, Compressed Air or Electric Power

The Loomis Machine Co.

TIFFIN, OHIO

AETNA
EXPLOSIVES

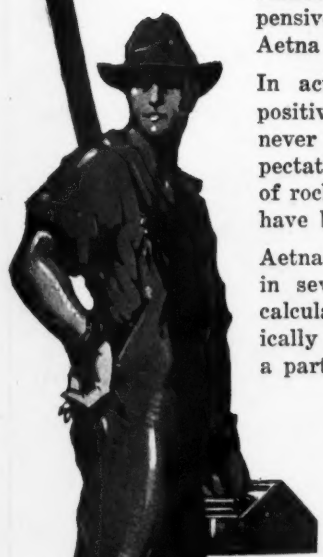
POSITIVE RESULTS

After you have spent weeks of preparation for a big shot, you can not afford to be disappointed in the results. Disappointments are expensive. Avoid them by using Aetna Explosives.

In action, Aetna Explosives are positive and dependable. They never fail to live up to your expectations as to quantity and size of rock broken, if your calculations have been correctly made.

Aetna Explosives are manufactured in several grades, each carefully calculated to operate most economically in connection with rock of a particular type.

The practical experience of our blasting experts is at your command without obligation.



AETNA EXPLOSIVES CO., INC.
165 Broadway, New York

Buffalo, N. Y. BRANCHES Norristown, Pa.
Birmingham, Ala. St. Louis, Mo.
Chicago, Ill. Wilkes-Barre, Pa. Pottsville, Pa.
Denver, Colo. Joplin, Mo. Pittsburgh, Pa.
Duluth, Minn. Louisville, Ky. Roanoke, Va.

AETNA

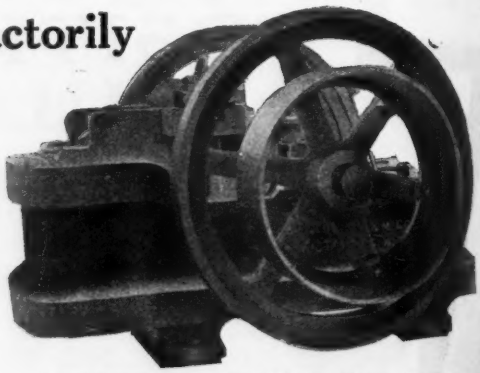
It does the work!

LEWISTOWN FOUNDRY PRODUCTS

Will satisfactorily meet your

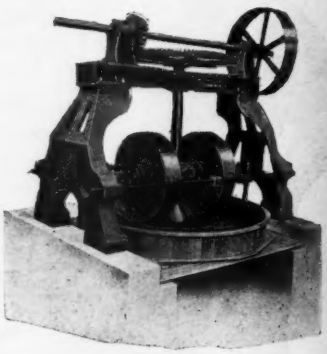
CRUSHING
GRINDING
SCREENING
WASHING
DRYING
ELEVATING

needs

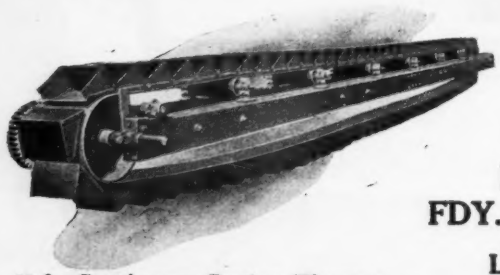


Lewistown Standard Blake Type Crusher

We manufacture a line of equipment for the above purposes in pit and quarry service and shall be pleased to furnish you with any desired information on whatever class of equipment you are interested in.



9-Foot Dry Pan



40-ft. Continuous Bucket Elevator

LEWISTOWN FDY. & MACHINE CO.

LEWISTOWN, PA.

Specially Designed Belts for Conveying

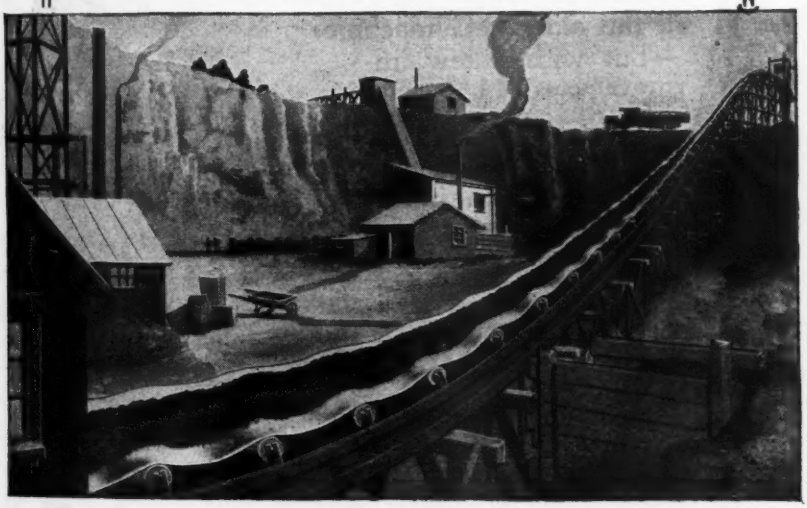
SAND AND GRAVEL

The problem of conveying these two commodities should not be trusted to any except a strong, sturdy belt, specially built to withstand severe usage which is to be expected in handling sand, gravel, crushed rock, stone, cement and similar products.

DESERT CONVEYOR BELT

By its construction of extra heavy duck, strong friction and its thick, tough cover, it is the ideal belt for use in quarries, cement plants, washeries and other industries where hard, abrasive articles are conveyed.

Our belting experts will gladly advise you with your Belting problems



QUAKER CITY RUBBER CO.

Manufacturers of Mechanical Rubber Goods

PHILADELPHIA 629 Market St. **CHICAGO** 182 W. Lake St. **PITTSBURGH** 211 Wood St.

NEW YORK, 53 Murray St.

The New B-G Loader

Model 20

Full length crawlers, 58" long by 8" wide make it possible for this new B-G Self-Feeding Bucket Loader to operate under any and all conditions. Especially in sand and gravel pits where the footing is poor is this new feature of the greatest importance.

Many Other Features

The patented rotating disc feeder remains nearly the same as on all the older B-G machines —but with a few improvements — 4 cylinder truck engine — one man control—best of materials and workmanship throughout.

And remember this fact, that Model 20 is not an experiment, but is simply a new and better machine built by the pioneers in the material handling machinery field. B-G engineers will gladly work with you. Tell us your problems and get a copy of Catalog N.

Barber-Greene Company

AURORA, ILLINOIS, U. S. A.

BRANCH, SERVICE AND SALES OFFICES:

New York, Philadelphia, Boston, Atlanta, Montreal, Buffalo, Utica, Cleveland, Detroit, Minneapolis, Pittsburgh, Chicago, Minneapolis, St. Louis, Omaha, Birmingham, Louisville, Kansas City, Dubuque, Salt Lake City, Portland, San Francisco, Los Angeles

Canadian Agents: Montreal, Toronto, Winnipeg, Toronto, Vancouver

ALLIED MACHINERY COMPANY OF AMERICA

Easton cars stand up under overloads, careless treatment and the elements alike, to the full satisfaction of the boss who wants to make a good showing, and the gang which is trying to make a record clean-up.

Easton cars work **right** because they're designed by engineers who know from twenty-five years' experience what is needed in a car. They work **long** because they're made of good material by capable workmen. They save money because they fit the job.

Furnishing the right kind of a car is only part of Easton Service. All the rest of an industrial railway's equipment—track, switches, turntables and small parts—are included in Easton facilities.

Let our engineers help you. Their advice is competent—and free.

EASTON CAR & CONS'T'N CO.

Church and Dey Streets, New York
Works: Easton, Pa.

New York
Detroit
Boston
Chicago
Pittsburgh
Philadelphia

20T6E

"No Other Truck Matches FWD"

Writing to another contractor who asked about the performance of the FWD truck, C. W. Johnson, contractor, of Lewistown, Mont., says:

"I have found the FWD truck to be the No. 1 truck to use for all purposes in hauling heavy loads. No other truck of any make matches it. If you intend to buy a truck buy an FWD. You will never regret it. The next I buy will be an FWD."

FWD

The boys from the front will tell you

TRUCKS

The FWD's standard 56-inch tread, its saving of 44 square feet ground space and its short turning radius make it easy to get in and out of quarries, sand and gravel pits and other places where ordinary 3-ton trucks cannot operate. It cuts down trip time—hauls more loads per day. The ideal truck for road building and all other contract work. Equipment for handling every special requirement can be provided.

The Four Wheel Drive Auto Co.

Canadian Factory: Kitchener, Ont.

Dept. 114
Clintonville, Wisconsin

DUPLEX TRUCKS
BUILT FOR BUSINESS

Careless Truck Buying Makes Transportation Cost Too Much!

The Truck is a Piece of Business Machinery. It Should Represent the Most Economical Method for Doing its Particular Job. Buy Your Truck on That Basis—And it Will be a Good Investment

RISING costs and the shrinking value of the dollar to a large extent can be offset by *intelligent buying.*

A steadily increasing number of business men are *getting* the facts and then *buying* their trucks on the basis of the facts.

There are many good trucks on the market. But value in a truck, very much like character in a man, isn't always completely revealed by what the eye can see.

Back of every Duplex Truck are *Fundamental Principles*—of design and of construction—factors that result in the *remarkable degree of service value in Duplex trucks for the man who buys.*

There is Nothing Somebody Else Can Do to Save a Man From Paying the Price of His Own Limitation or His Own Carelessness

Look in the used car columns of your local paper. Note the number and makes of trucks offered for sale and *think about* all the reasons.

In one day in three cities 324 different used trucks were listed for sale—and not one Duplex among them.

Are these trucks for sale because they were not bought right?

There is something significant here when you stop to analyze it.

Why is this tendency to standardize on Duplex so noticeable of late years?

The answer is very likely that trucks are *more and more being bought on the business basis of service delivered and what the service costs over a period of years.*

This is a Time for Intelligent Buying

A truck is just as much a piece of business equipment as any other piece of machinery. Its value is in *what it does and how cheaply it does it.*

Transportation is a necessary part of every business.

A truck gives a business man transportation facilities—at a high or a low price. *It depends on the fitness of the truck for the job.*

Now take a man who buys a truck for his business without getting all the facts first. Later he discovers that his truck is not as economical as it should be. He sells it at a sacrifice and gets another—and so on. Finally he buys the truck he should have selected the first time.

What is the result?

He pays too much for his transportation. His costs for trucking are not right.

The Duplex Users of Today are Probably the Most Intelligent Buyers and Users of Trucks in America

Think of this—ninety per cent of the Duplex dealers have been distributing Duplex Trucks ever since this company was first organized.

What does this signify? It shows for one thing that their customers have found the Duplex Truck to be a successful truck for them.

The great significance of all this is that *Duplex users stay Duplex users.* Many of them had tried out five or six different makes of trucks before they got their first Duplex.

The whole history of this business shows that when a man buys his first Duplex it is only a little while until *he standardizes* on Duplex.

Get the Facts for Yourself

We have hundreds of letters from users in our offices that show some very remarkable facts. They are not edited. The letters stand just as they were written.

If you are a truck user and want to read these letters write us and we will send them to you for your private perusal. For ethical reasons we do not care to publish them.

What Do You Think?

Duplex 4-Wheel Drive

Many companies in the heavy duty fields say that the Duplex 4-Wheel Drive is the only successful truck they ever owned.

If your kind of work has proved too much for the ordinary truck—you will find that the Duplex dealer near you can give you some really interesting **facts.**

Many owners still seem to be using the **wrong kind** of trucks. Get the Duplex facts.

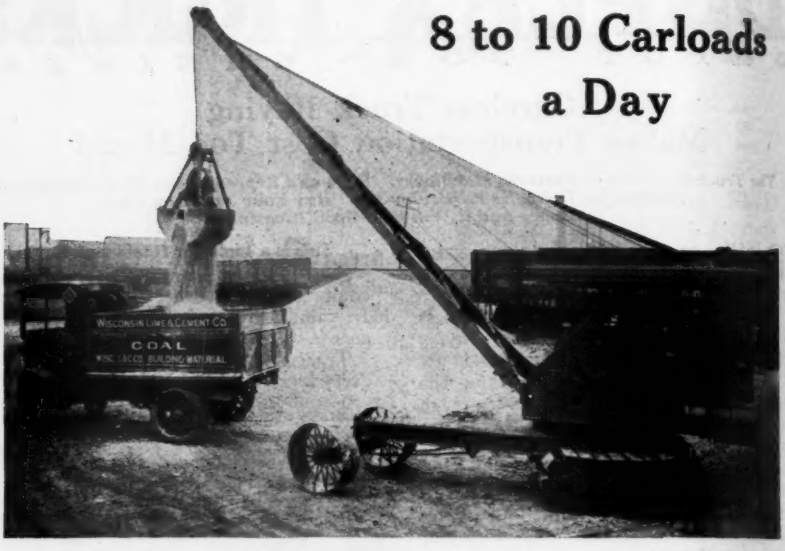
The Duplex Limited

Thoughtful men have entire confidence in the Duplex Limited—feeling that this **high speed** Duplex is a safe investment because of the fact that it **is** a Duplex.

Medium capacity—Pneumatic Tired—Two Wheel Drive—Full Electrical Equipment—here is a Speed Truck that **lasts.** Strong, rugged, mechanically and constructively **right**—it handles as easily and smoothly as a passenger car—and at a minimum of upkeep.

Duplex Truck Company
Lansing • Michigan

One of the Oldest and Most Successful Truck Companies in America



THAT is what one Chicago concern, the Wisconsin Lime & Cement Co., is doing with a P & H Excavator Crane—unloading 8 to 10 carloads a day, with a man in charge who is not a high-priced licensed engineer.

The P & H requires no propping or stabilizing, and can be shipped without dismantling.

And it will do many things beside unload sand, gravel, crushed rock, and other loose materials.

Get the whole story in our Bulletin 5X.

PAWLING & HARNISCHFEGER CO.

50 Church St., New York
704 Stephen Gerard Bldg., Philadelphia
926 Whitney Central Bldg., New Orleans, La.
47 Fidelity Bldg., Pittsburgh, Pa.

EST. 1884

MILWAUKEE, WIS.

1241 Monadnock Block, Chicago, Ill.
Pittock Block, Portland, Ore.
1125 Central Bldg., Los Angeles
821 Monadnock Bldg., San Fancisco.

P&H — excavators — back-fillers - tampers

PAIGE

The Most Serviceable Truck in America

MOTOR TRUCKS

The increasing adoption of Paige Motor Trucks is significant of a growing tendency on the part of modern business establishments to choose transportation equipment on the same basis as other industrial machinery.

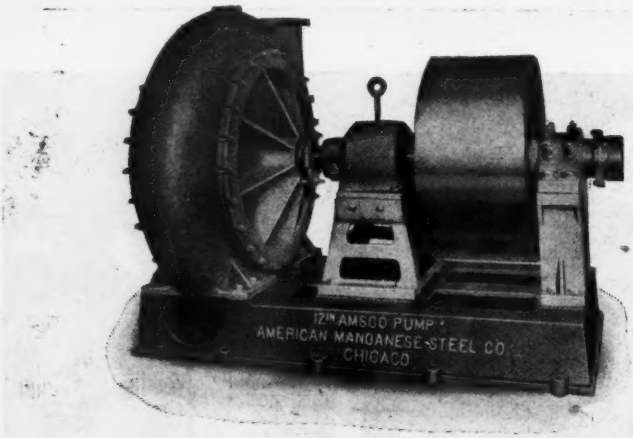
Just as the value of factory equipment is estimated according to the unit-cost of the operation which it performs, so the value of a motor truck is now determined on the basis of cost per ton-mile.

We, of the Paige Company, have no hesitation in endorsing this modern method of judging a motor truck. For we know from experience that the mechanical excellence of the Paige insures such economical performance and freedom from repairs that its per-mile cost of operation is notably small.

If you select your next motor truck on this logical basis, it is more than likely, we believe, that your choice will be a Paige.

PAIGE-DETROIT MOTOR CAR COMPANY, DETROIT, MICHIGAN

Manufacturers of Paige Motor Cars and Motor Trucks



AMSCO

Sand and Gravel Pumps Give Satisfaction

Of rugged construction, built for hard service. They stand up day in and day out, month after month. Their operating efficiency—percentage of days on active duty—is the reason they are bought in ever increasing numbers.

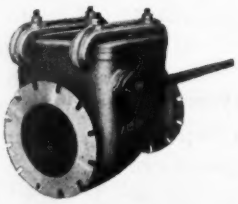
Manganese Steel for shells, runners, and side plates gives longest wear.

Slotted Flanges in side plates dispense with troublesome stud bolts. Solid ring gaskets are used.

Thrust Collar ball bearings reduce end thrust friction losses.

Balanced Runner and extra heavy shaft make the AMSCO Pump a smooth running machine.

AMSCO **Flap Valves**
Pipe
Elbows



Write for Pump Bulletin.

American Manganese Steel Co.

General Offices: 1875 McCormick Building, Chicago

Western Sales Office: Newhouse Bldg. Salt Lake City

Pacific Coast Office: Insurance Exchange Bldg. San Francisco, Calif.

Eastern Sales Office: Hudson Terminal Bldg. New York City

Foundries: Chicago Heights, Illinois—New Castle, Delaware—Oakland, California

WITH "Marion" standard and Revolving Shovels in "dry" sand and gravel plants and "Marion" Draglines and Dredges in underwater operations, sand and gravel producers hold their output on a steady and profitable basis.

We are now building certain popular types of "Marions" in greater quantity and are advancing deliveries rapidly.

We'll gladly give you, in detail, complete estimates on cost and the shipping date of a "Marion" for you.

THE Marion STEAM SHOVEL CO.

Established 1884 Marion, Ohio

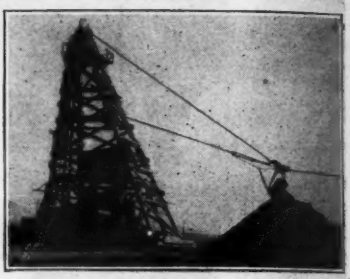
New York Chicago Atlanta San Francisco

Billings, Mont., F. B. Connelly Co.
Dallas, F. E. Wright, Bush Bldg.
Denver, H. W. Moore & Co.
Detroit, W. H. Anderson Tool & Sup. Co.
Philadelphia, H. L. Cox, 11th & Cherry Sts.
Pittsburgh, J. W. Patterson
Portland, Clyde Equipment Co.
Salt Lake City, H. W. Moore & Co.
Seattle, Clyde Equipment Co.
Montreal, Toronto, Vancouver, Vancouver Mach. Depot, Ltd. F. H. Hopkins & Co.

EVERYWHERE—RELIABLE
The Marion Steam Shovel Co.
ESTABLISHED 1884

SAUERMAN
DRAGLINE CABLEWAY EXCAVATORS

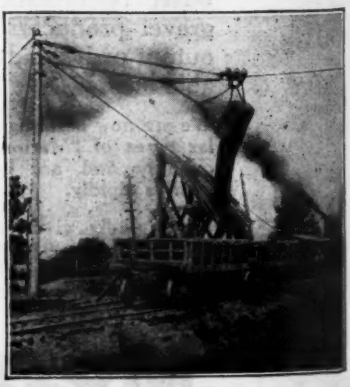
Here's the Solution of Many Excavating Problems



For excavating and handling materials over a large area, the Sauerman Dragline Cableway Excavator is generally the most economical machine to employ, as it does away with the auxiliary conveying system required by other types of excavators.

Its ability to work over spans of 100 to 800 ft. or more and to dig, elevate, convey and dump in one continuous operation makes the Sauerman Dragline Cableway Excavator particularly economical and efficient for digging sand, gravel and other materials from under water and it is often used instead of a pump or dredge.

This same long operating radius and deep digging ability have led to the use of our dragline cableway excavator for a wide variety of other excavating work which cannot be economically handled with steam shovels or boom dragline excavators. It is being successfully used for deepening rivers, building levees, stripping clay beds, mining placer materials, cleaning reservoirs, reclaiming ore and coal from stock piles or storage, loading ballast, etc., in addition to being standard equipment for commercial sand and gravel plants.



The experience of our organization of engineers is at your service if you have a gravel deposit to develop or any work involving excavating and handling materials. Our 130-page illustrated catalog will gladly be sent free on request.

SAUERMAN BROS.
312 S. Dearborn St. Chicago

- dig, convey, elevate & dump in one continuous movement under complete control of one man.

Pit and Quarry

A Monthly Journal for Producers of Sand, Gravel, Stone, Cement, Gypsum and Lime
Member Audit Bureau of Circulations

VOL. 4 | CHICAGO, ILL., JULY, 1920 | NO. 10

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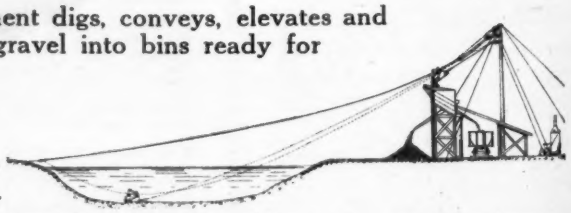

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Pit and Quarry

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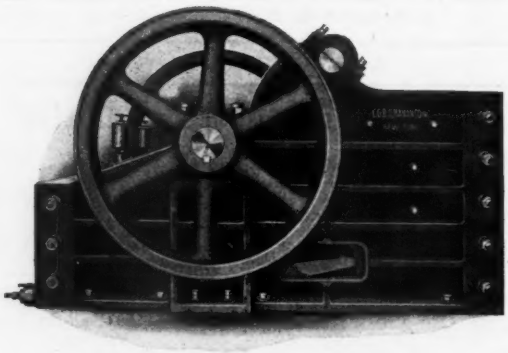
Crushers of Unusual Strength



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Pit and Quarry

Vol. 4 Chicago, Ill., July, 1920 No. 10

Lime Industry In Perspective

Address of President Charles Warner Before the Convention of the National Lime Association

WE meet again for our annual rally and convention under conditions both interesting and highly important to our country and our industry. As citizens of a great country and as active members of a highly important industry essential to our country's welfare, we have a responsibility which I know from personal contact with many of you, will be lived up to.

It has been proven time and again that the men of our industry are willing and ready to go over the top to the last ditch on national issues of importance both to the country and the industry.

We have but to turn back to a few pages of recent history covering our support to the war needs of our country and the subsequent peace needs of our industry to prove our loyalty and vision. While we have trials and tribulations ahead of us due to many unsolved problems that will try men's souls, yet we are undoubtedly standing on the threshold of a decade of opportunity and development.

Many of us have had strong convictions of the bigger place that our industry can be made to occupy among the major industries of our country, else we could not have so courageously fought through the preliminary troubles of the past two years of babyhood of our new national effort. Only two years ago we took our first ambitious step. With the first year's experience it appeared to many of our members that we were a bit too centralized in our form of organization, that opportunity did not fully prevail for developing the latent interest of our members and to utilize their practical views on local as well as National problems. In fact it was felt by many manufacturers that we should endeavor to develop a more de-centralized plan of operation for certain parts of our association work.

Some considerable difference of opinion, quite sincere on the part of both groups, arose on the discussion of this broad policy. The majority decision favored the modification and the revised plan was finally adopted less than nine months ago by a special convention of this national body.

You are all familiar through frequent communications and district conferences with the present general aim and policy of your association in the conduct of its work. Whether in this readjustment the pendulum has swung a bit too far the other way to meet the views and needs of the membership in some sections of our country is a question for open discussion that

should have thorough, sincere and honest consideration at this annual convention. The revision of our by-laws accomplished about nine months ago flexibly provides either for the direction of district work and issues by district committees, or its active guidance from National headquarters.

The budget needs for general and national work must, however, in all cases be carefully segregated from the specific expenses of field promotion in the district. The expenses for district work in each case according to our present by-laws must be provided for by special district assessment. Some districts are already in active swing utilizing their own forces as well as the active co-operation of the national organization in order that each part of our promotional work may be carried through from start to finish, i. e., from the inception and development of basic ideas and knowledge to its fruition in the enlarged and stabilized demand for lime.

Other districts after watching the work of the past nine months are now on the eve of launching their district organizations and field work with such measure of local directing responsibility as may be mutually arranged between the national organization and the specific district. Still other sections of our country are without the local organizations to plant the seeds of knowledge and practical experience developed by our National body, in the mind of prospective customers.

Your president and staff have made repeated efforts through most sections of the country to bring around active work in all districts, believing in the fundamental importance to the membership in each section of the country of gathering together at frequent stated periods at some central point in their district to confer on the suggestions and literature issuing from the National organization and to advantageously apply these through their active use in district field work. Most all sections today are fully alive to this need, but in sparsely settled sections it is entirely probable that your National organization will be called upon and should render more active guidance in the field work, providing the members in such districts make the necessary special appropriations.

Do we need this work started more energetically in every section? Most decidedly yes. There is not one of you who can tell how soon the business pendulum of this country will swing back to the side of depression and reverse the condition now existing in most territories, from one of excess demand to one of over supply.

Now is the time to utilize a fair proportion of what profits we have, to nourishing the youthful plant that must bear us fruit when the drought comes, as it surely will come.

Many interesting issues confront our industry. If, as many of us believe, our largest field for tonnage expansion, East and West, North and South, lies in the tremendous, growing and permanent need of lime on the soil, and if as has already been demonstrated in many sections the variety of uses and better action of the burnt forms of lime offer, in the end, the most attractive product to the agriculturist, then to supplement our promotional work and to balance our plant operations, we face a problem of storage and warehousing which can well deserve our best attention.

The agricultural demands in most districts vary greatly with the seasons. This fluctuation in trade demand is so great as to overtax by at least two fold the present production in many sections of the country during the peak seasons, and to reduce the demand to a bagatelle during the dull seasons. With the usually active demand seasons aggregating less than six months of the year, it can be seen how broad this problem is, how much it affects our profits, from low pro-

duction and overhead expenses during the dull months, and finally and more important than all, how seriously it is prejudicing our standing as an industry in the eyes of the farmers of our country because of our inability to adequately supply their needs at the time they want lime products on the farm.

Both our pocketbooks and prestige are today as an industry suffering to a critical extent from this condition.

There have been spasmodic efforts involving temporary and abnormal arguments to the agriculturist, to take in lime at off seasons. This has not, however, provided any permanent relief. Our industry today must arouse itself if it is to build its position securely with the farmers of the United States by promptly meeting their seasonal demands. This situation is not without its effect on the prestige of our industry in supplying both the construction and the chemical users of lime. When the agricultural demand sets in, the reaction is detrimental in shortening the available supply to the construction and chemical fields and creating dissatisfaction there. Certain sections of our country which are yet young in the agricultural end of the lime business, but which in the next ten years will experience such a trade development as they little realize today if they but utilize our national force for farmer education, may not fully appreciate at this moment what this storage and warehousing problem means. But if we can take early steps to solve this problem in the territories now partly developed, we can, step by step, apply the solution to the newer sections of the country in the use of agricultural lime as their trade expands.

To meet this situation some companies have already developed considerable storage facilities at their points of production. This helps, but when the rush season hits such plants the rapid building up of additional labor crews to complete the processes of manufacture, and of bagging and loading the finished products, and the further problem of car supply, still seriously handicap prompt delivery to the trade.

There may be several ways to improve this situation so that our industry can stand to the front as prompt deliverers of lime to the farming communities at needed times. For instance, it may be possible for individual manufacturers or a group of manufacturers collectively operating to organize a lime warehousing corporation, where group action could be arranged. Each subscriber to the stock of the warehousing corporation might be entitled to such proportion of the aggregate capacities of warehouses to be erected as his stock subscription would bear to the total stock subscriptions of all lime manufacturers.

Such a warehousing corporation should proceed to carefully study the principle market delivery points within the territory reached by the subscribing members, and then determine the best points for erection of warehouses and the proper capacities that each warehouse should have, dependent upon the normal demand for lime products at each point. If the plan should provide for the manufacturer to hold and sell his own lime from warehouses when the season opened up, then no special sales arrangements would have to be made through and with the warehousing company; but if it should be deemed proper for the warehousing company to market the goods when the season demands start, then the individual manufacturers should sell their product to the extent of their percentage, to the warehousing corporation and ship to warehouses during the dull season on a price basis sufficiently under the prevailing market prices to allow ample

profit and reserve to the warehousing corporation.

A proposition of this kind might be started in a relatively small way by erecting not more than six or eight warehouses in a certain field for a try out, and then after getting a year's experience in the handling of the organization, it might be rapidly extended to cover the most important agricultural consuming districts.

You can all readily grasp the opportunity and advtanges of a plan of this kind providing we can work out a fair and equitable basis for handling such a joint warehousing problem. This arrangement should lead us to a vastly better condition of balance in production and shipping at the plants of those members subscribing to the enterprise. Such warehouses will also supply the farmer with his liming materials at his local shipping point, at such times as are convenient to him for hauling and spreading the material. I cannot help but feel that our members from the South and West will in the end be just as vitally concerned over the successful development of a warehousing problem as those of us in other sections who are already observing the effects of our serious fall-down in establishing permanently satisfied customers. It is hoped that a frank discussion of this subject may help create a better situation.

There will be presented to you later today and tomorrow, a comprehensive outline of the work of the association, the plans for its further development, and the budget needs for the coming fiscal year if your national organization is to fully serve you in preparing for our great future.

In concluding this general report, I have one word to say of a personal nature.

I entered upon the work of the presidency of this association on October 1st last, with many misgivings, and a great load upon my heart because of the conditions that had apparently forced me into this position of responsibility. It is your duty to determine the results of these first few months of effort on behalf of the re-organized association. It has also involved much work in remoulding the old organization to conform to the new policy and the new budget.

After progressing part way through the last eight and one-half months, your directors became satisfied that with increasing costs and improving plans for the central office work we had cut our financial cloth a bit too short on October 1st, last. It was a most loyal and gratifying experience to me to have the directors voluntarily propose to temporarily finance the deficiency for the plans of the fiscal year ending June 30, 1920.

It is up to the directors to recommend and to the convention to decide on the further extension of our work beginning with the new fiscal year, July 1st, 1920. I can only state to you all in closing this short period of my official responsibility, that I keenly appreciate the loyalty, the support and the helpful suggestions, which have come from the membership in all sections of our country.

I sincerely hope that on the whole you will find this preliminary work accomplished to your general satisfaction. These results cannot meet with your full approval on all points, as they certainly have not fully satisfied me. But, considering the facilities available, we have made much progress as those who have carefully followed our work will unquestionably agree.

I sincerely trust that on nearing the completion of this annual convention, you will be justified for the sake of our industry in providing the necessary increases in burget to carry through the next twelve months closely in accord with the recommendations presented.

Statistics on the Lime Industry

By EDITH J. MUNSELL

STATISTICS for the lime industry are not easy to compile. The difficulties involved are due in general to the fact that insufficient details on the lime industry are reported to the United States Geological Survey, and to the further fact that the Geological Survey is not in a position at present to compile such reports exhaustively. As an example of the difficulties, statistics on lime are not differentiated according to fineness of the screen used. It is therefore impossible to know in what amounts, according to fineness, lime for agriculture is being applied on the land. For the same reason, values for one state will appear distorted in comparison with others, due to the fact that the price for screenings may have brought the general average down to a ridiculously low figure.

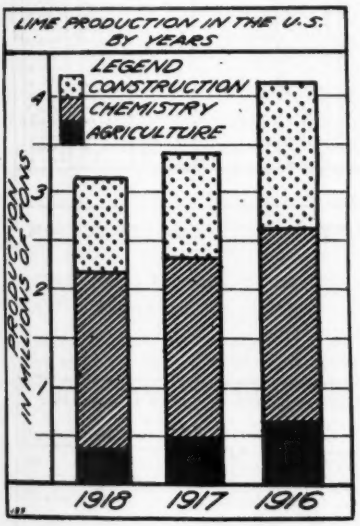

Fig. 1

Again, it has been impossible up until the present to make a comparison between the use of lime and limestone in the separate industries, since the production of limestone is not always obtainable on the common basis of tonnage, but in cubic feet, for example.

It is not possible at present to show consumption of lime by states in the separate industries, so that all the data here shown are necessarily presented on the basis of production.

The first diagram shows comparatively the total production of burnt lime for the years 1916, 1917 and 1918, in the separate fields, agriculture, construction and chemistry. The relative decrease in the industry is apparent. The decline, it should be noted, is largely confined to the construction field and to a more limited extent to agriculture. Chemical uses of lime over this period very nearly held their own.

Fig. 2 shows the proportions previously indicated, differently arranged and in greater detail. Agriculture and construction show a steady decline, while the tonnage of lime in chemical uses remained almost constant over the three-year period.

Fig. 3 shows the distribution of burnt lime in the industries on a percentage basis, each bar indicating total or 100 per cent production for each year, with divisions denoting in percentage the lime produced for agriculture, chemistry and construction purposes. On the percentage basis, it will be seen that agriculture declined gradually from 15 per cent of the total industry in 1916 to 12 per cent of the total industry in 1918. Construction dropped from 37 per cent in 1916 to 29 per cent in 1918, while chemistry benefited by the decline in the other

A paper given before the Convention of the National Lime Association.

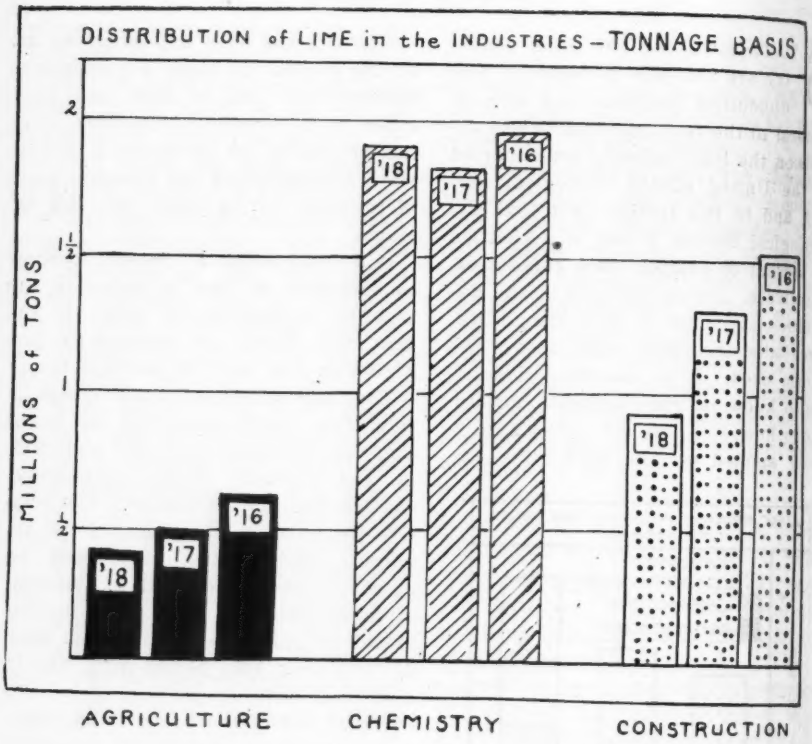
DISTRIBUTION of LIME in the INDUSTRIES – TONNAGE BASIS
MILLIONS of TONS
2
1½
1
½
'18
'17
'16
'18
'17
'16
'18
'17
'16
AGRICULTURE
CHEMISTRY
CONSTRUCTION

Fig. 2

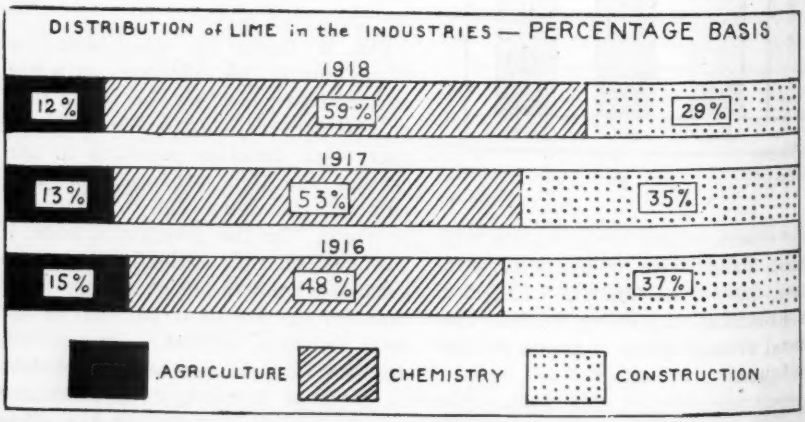
DISTRIBUTION of LIME in the INDUSTRIES — PERCENTAGE BASIS
1918
12%
59%
29%
1917
13%
53%
35%
1916
15%
48%
37%
AGRICULTURE
CHEMISTRY
CONSTRUCTION

Fig. 3

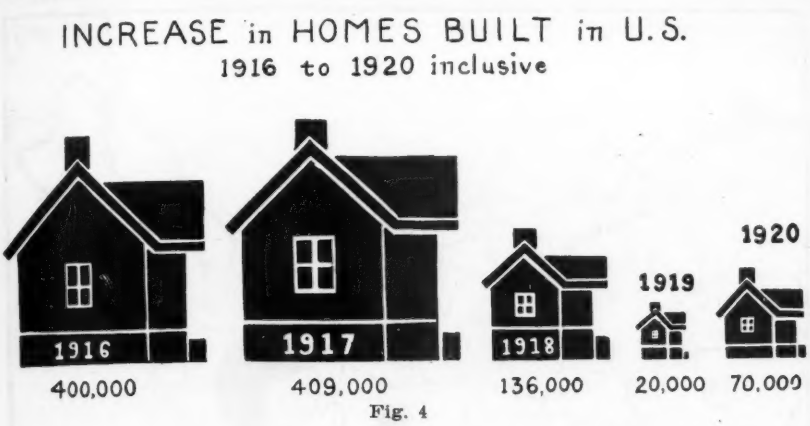

Fig. 4

two fields, increasing from 48 per cent of the total production in 1916 to 59 per cent in 1918.

The outlook for demand in the lime industry based on the statistics that are available is very bright. In the chemical field, the very fact that lime held its own over the wartime period is indicative of its further increase. Added to this is the further fact that lime is essential in one or more processes of 115 out of the 165 chemical industries listed in the United States census. As these industries become more varied and more complex, the demand for lime in chemistry can naturally be fostered.

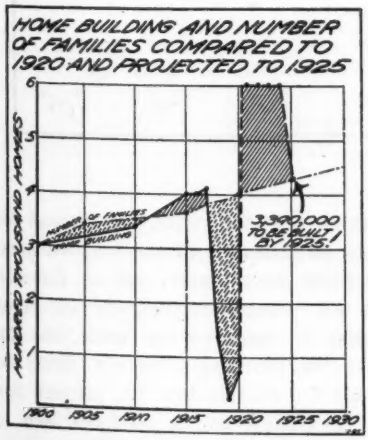

Fig. 5

The use of lime in construction likewise shows promise. While the amount of lime used in construction fell perceptibly during 1917 and 1918, it is obvious that its use must increase proportionately with augmented construction. If the use of lime decreased in the construction field, its decline was inevitable owing to the decrease in construction itself. Illustrating from just one field of construction, that of home building, the situation may be pictured somewhat as shown in Fig. 4.

The statistics on which this graph is based appeared in the April 13 number of Building Supply News. From the increase in 1916 and 1917 at the rate of 400,000 and 409,000 respectively each year, home building declined sharply to 136,000 new homes in 1918, and but 20,000 in 1919. Thus far in 1920 the outlook shows pronounced improvement.

Fig. 5 compares the trend of home building over the last twenty years with the increase in number of families over a corresponding period, and projects what the future of home building must be over the next five or ten years in order to make up the deficiencies of the years 1917 and 1918 and relieve congestion.

If the pre-war basis of 115 families to 100 homes is realized by 1925,

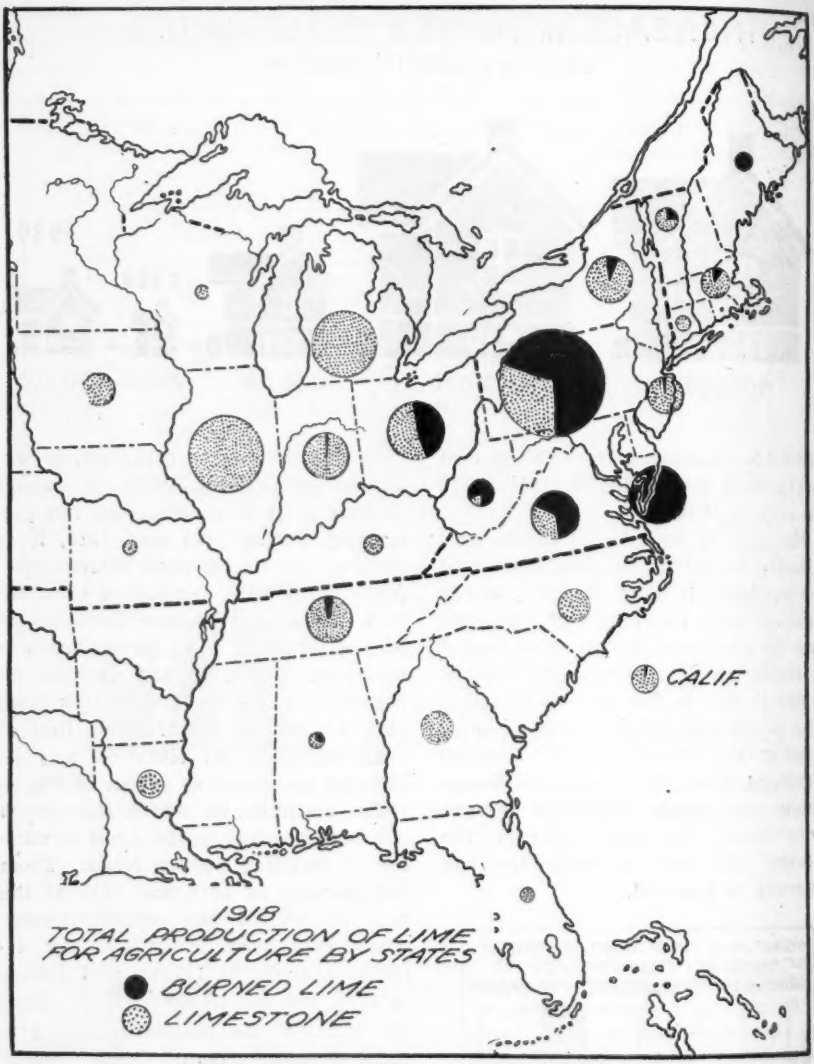

Fig. 6

3,340,000 homes will have to be provided between now and then. This means about 675,000 homes a year, as against 400,000 in 1916, or an advance of more than one-third beyond the most flourishing history of the industry.

If home building is to increase 33⅓ per cent beyond normal during the next five or ten years, the demand for lime in this field of construction must increase accordingly. If an increase at all comparable occurs in other types of construction work, the future for building lime can surely be made to overshadow its present use in chemistry, which we have seen to be so large.

WASH.
CALIF.
PRODUCTION OXIDE OF LIME FOR AGRICULTURE IN RELATION TO ACREAGE OF IMPROVED LAND
● = 5 LBS. LIME PRODUCED PER ACRE
○ = 1 LB. LIME PRODUCED PER ACRE

Fig. 7

The largest possibilities for expansion of the lime industry are apparent in the field of agriculture. Production of both burned lime and limestone as reported by states through the United States Geological Survey are shown in Fig. 6. The extent of this production is here broadly indicated for the year 1918. The dotted areas indicate production of limestone, the solid black burned lime. In both cases the circles have been plotted on the basis of oxides contained. It will be observed that for the industry as a whole, Illinois, Michigan and Pennsylvania are in the lead, while for burned lime Pennsylvania, Maryland and Ohio are the largest producers.

Fig. 7 shows the amount of agricultural lime each state is producing per

acre of improved land. Each black dot indicates a production of five pounds of lime or limestone per acre of improved land. Thus Pennsylvania produces 40 pounds per acre, as do

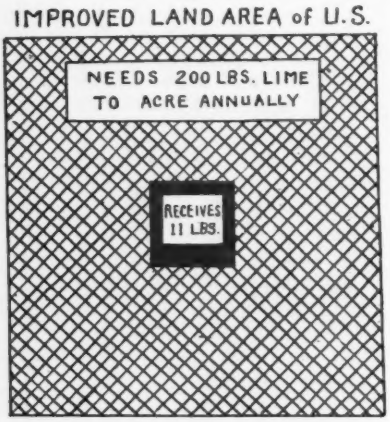

Fig. 8

New Jersey and Maryland, also New York produces about six pounds to the acre, Ohio eight pounds, Wisconsin 0.6 pound. Averaged for the states shown, eleven pounds of lime per improved acre is being produced. It must be remembered, however, that some states which need lime for agricultural purposes, produce no lime or too small a quantity to be represented on the map for purposes of comparison. New Hampshire, Delaware, Alabama, South Carolina and Texas may be cited as examples.

Taking into consideration the lime needs of the states individually, we find that an annual application of about 200 pounds of oxide of lime to the acre is essential. In view of the fact that the states producing lime average a production of but 11 pounds each, the amount that is needed on the land is, roughly speaking, 20 times as great as the total annual tonnage of burned lime produced today for chemical, construction and agricultural uses combined.

Which Is Which?

Are the people here merely to serve the purpose of the railroads, or are the railroads for the service of the people?

Must the industries of the country be curtailed and trimmed to fit an outworn railroad system, or will the railroads be fitted to the needs of our growing industries?

Why should coal be given preferential movement in early summer?

When are we going to build highways and do other necessary and desirable construction work?

Are the railroads making any attempt to start a car-building program, or will they wait until freight tariffs are increased and until construction costs are lower?

Are the railroads interested in the delay of highway building, through fear of the competition it will bring?

Is the Interstate Commerce Commission in existence to serve the people or the railroads?

Are cars distributed according to pull, public policy, or personal privilege?

We ask it—which is which?

Plain Facts About Immigration

By WILLIAM H. BARR
President, The Inter-Racial Council
233 Broadway, New York

IN discussing immigration, a few plain facts are better than a million prejudices. The United States has always depended upon immigration. The unskilled labor that has done the digging, hauling, track laying in this country, is a reminder of the service rendered by the immigrants of the past. As the American children of immigrants have prospered, these descendants, like other Americans, sought other and more attractive tasks. So one wave of immigration after another has followed with pick and shovel, pushing up the wave ahead to a better wage level, and in time being itself pushed up by still another wave. And because there are so many resources in the United States to be developed, the call for unskilled labor goes steadily on.

During the war the net increase of immigration was negligible. Our people did a big war job, and a good one, but in doing it, other big jobs like the making of new rights of way, and the building of new homes had to wait. We are short of these things now, and never before have we realized the lack of them so keenly.

Almost everybody supposed there would be a tremendous rush from Europe when the war was over, not only because of our needs, but also because of conditions over there. The great rush has not come yet, though many of those who prophesied it would, do not seem to be aware of the fact. Already they are talking about the hordes of laborers that are going to swamp this country, and about the dangers that threaten us. We are gaining a little on immigration in numbers, but we are losing, not gaining, on the number of unskilled male laborers.

As after every war, there has been a great deal of industrial unrest, and it has not been limited to any class. These people that are afraid of immigration are the ones who attribute all the unrest to the foreign born. If a man cannot speak English, they seem to think he is an anarchist or something worse. For such a state of mind the wonderful record of the foreign-born in the United States, their military service, their enormous purchases of stamps and bonds, all count for nothing. It must be part of the post-war psychology. A lot of usually sensible people can work themselves up into a fury of suspicion and condemnation without reference to the real facts.

Of the foreign-born immigrants in the country today, it may be said that, as a whole, they are attending to their regular business. Among them here are, of course, professional agitators, although most of these are native born. But the general body of immigration is honest, industrious, and loyal, and it resents the suspicion and attack to which it is subjected. Immigrants are called by contemptuous nicknames. They are threatened in some states with the loss of their press, the only one they can read. In other states, they are penalized, even to the extent of being denied the right of earning a living unless they become citizens, as though the sacred right of citizenship were something for barter, to be sought at the price of a job. It is questionable Americanism to force this sacred right instead of treating it as a very special and splendid privilege open only to those who long for it.

These immigrant workers among us hear a lot about Americanization, but too often of the wrong kind. When a

self-respecting laborer is talked to in the strain that a traveling evangelist might address the village drunkard, when his language, his people, and his customs are ridiculed, when the attitude towards him implies that he has neither an opinion worth expressing nor an intellect worth using, then, like any other person who earns his pay, he does not like it.

Immigrants are being subjected to mischievous propaganda all the time, and if they listen, it is usually because the people who are engaged in this propaganda talk to them as equals, as decent human beings, and not as subjects for "uplift" treatment. If they are restive and resentful, it is because they feel they are misunderstood. But they would stand with us staunchly if any trouble came, just as they did before. Of every hundred newspapers published in foreign languages in the United States, more than ninety are loyal to America.

Conditions in Europe are bad for a poor man, yet a great many of the immigrants here, who used to invite their relatives to come over, are now going back themselves. Those who are coming in are mostly women and children; those who are going out—and the ships are filled—are for the most part strong, healthy men, who would be good citizens anywhere. The "intellectuals," that is, the professional trouble makers, want to stay here, for their pockets prosper on a gospel of discontent. Incidentally, it may be remarked that these are the ones who are not kept out, and will never be kept out by any literacy test.

As to future immigration, the alarmists need not worry. If every ship available today were packed to a capacity on every trip for the next two years, they could not bring over here more than a million and a half workers for factories, farms and households, all of whom the country needs. And this assumes that not a single foreign-born resident would leave here. Compare this with the falling off in immigration alone of more than three millions during the war, and talk about an "invasion" becomes absurd.

When Europe gets on its feet, the old political and religious oppression will have disappeared, or have been greatly reduced. True, the countries there will be badly tax-ridden, but the ordinary worker will not be the greatest sufferer. He can find abundant opportunity in Europe itself, for the devastated regions will need him and pay him well. Canada, Argentine and Brazil are all working for the immigrant, and some of them are offering inducements. Of all the countries needing the immigrant, because of its undeveloped resources, ours is the only one that abuses him.

But this is the best country for the immigrant to come to, and notwithstanding the misrepresentation which they have suffered of late, most of them know it. Give them fair treatment, and they would rather come here than go elsewhere. But it is not a question only of whether the immigrant will be admitted. If we permit him to come, we shall have to assume certain responsibilities we have been neglecting in the past. We have never had any whole-hearted, nation-wide scheme of education. Our tacit consent has permitted immigrants to be despoiled and exploited, for the most part by his kinsmen, but in the face of our indifference. Like many other things, we have left the whole question of immigration to chance, and we are learning now that that method has its penalties. We must have a constructive policy on immigration. That is what the National Conference on Immigration did. It presented a constructive policy for immigrant legislation.

Whatever is done in connection with the immigrant must be done largely with and through those of his

own people whom he knows and trusts. We must work with his newspapers—not against them. If we take a little trouble to investigate, we shall find that even a man who does not speak English or who does not eat the dishes we enjoy, can be a mighty good asset to this nation. What is more, his own children will give dividends in service worth many times even the labor of their parents. But whatever is to be done concerning the foreign-born it must be done in co-operation with industry. The immigrant worker makes his real acquaintance with conditions here in the place he works.

This is what the Inter-Racial Council stands for. A strong belief in the value of the good character, industrious habits and loyal attitude of the immigrant; a conviction that the immigrant is a valuable asset to us as he always has been; an appreciation of the value not only of his labor, but also of the cultures he brings with him. Once we accept him here, measures must be taken to insure education, financial protection, and reasonable assurance of safety. All this must be done in constant co-operation with industry as with every other agency, subject to the qualifying condition that whatever is undertaken must so far as possible be shared in by the immigrant's own people, and from the immigrant's point of view—all this to the end that when the immigrant becomes a good, sturdy, loyal citizen, he will be a living link of good will to his people abroad and to the country in which he was born.

The Superior Sand Company, Cleveland, O., has increased its capital stock from $30,000 to $100,000.

The American Agricultural Lime Company has been incorporated in Delaware. The men composing this company are William R. Hale, of New York; Hubert C. Reeve, Frank C. Wilson, Atlanta. Their authorized capital stock is $750,000.

Disposal of Containers of Explosives

Danger Lurks Even in Empty Dynamite Boxes

HIGH explosives are generally shipped in stout wooden boxes of convenient size, which are much sought after by miners and others for miscellaneous uses after they are emptied.

Although used explosive containers are so generally put to beneficial service, there is nevertheless an element of danger in their use. Dynamite boxes are particularly dangerous. Very often nitroglycerin exudes from the dynamite sticks and is absorbed by the wood of the box. Such boxes are dangerous because they are very explosive. Although a box that has not absorbed nitroglycerin is safe, yet there is always the danger that a person will get a box that is partly saturated.

On account of this danger, all mining companies should use extreme care in giving away used explosives containers. Some one individual who is acquainted with explosives and their peculiarities should act as inspector for every container given away. This job may best be handled by the man in charge of the powder magazines. A box that shows any stain of nitroglycerin should be destroyed by fire. The other boxes that are free from notroglycerin or dynamite can be used.

The boxes that have been condemned, together with the paper linings of all boxes, should be burned in a place sufficiently removed from all buildings, preferably in a deep hole or behind an earth barricade. The boxes can be ignited by using an electric igniter or a fuse of appropriate length to spit fire into oily waste or excelsior.

Relations of the General Crushed Stone Company to Its Employes

BY OTHO M. GRAVES,
Assistant to the President, The General Crushed Stone Company, Easton, Pa.

WE HAVE no elaborate scheme or particular organization for accomplishing what we believe to be desirable results in our industrial relations, nor are we undertaking this work as an expedient to tide over at least temporarily the unsettled restless labor conditions. We do not feel that we are showing any particular originality, and realize perfectly well that policies which may be applicable to this company would have to be modified considerably to adapt them advantageously to another industry.

This company operates nine separate plants and we have gathered the men of each plant together and held very straightforward and informal discussions of the situation. We have submitted to them as our conscientious belief the following principles:

1. That every employe is entitled to a fair share of any profits which may be made. Acting upon this belief, the profits of last year were divided in the following manner: Assume, as an example, that it required $2,000,000 to do business for the year, including depreciation and all other proper charges, and that the product produced was sold for $2,100,000. The profit on this business would obviously be $100,000. If the capital invested plus the annual pay roll is assumed to be $3,000,000, the percentage of profit is evidently 3⅓ per cent. Each employe would then receive 3⅓ per cent of his salary or wages for the year as his share of this profit. Dividing the profit in this way means that the profit to which the employes are entitled is to the total profit as the pay roll is to the combined capital invested and pay roll. In our particular case that share of the profits to which the employes are entitled amounts to approximately one-third of the total profits. No profit is realized, of course, until wages are charged off against operating expenses, and wages we believe should be the common current market rate, and 5 per cent paid to the capital, including the profit-sharing notes, as its wages or interest. That portion of the profit of last year, which was paid to employes, was issued in the form of profit-sharing notes dated January 1, 1920, payable on demand after January 1, 1921. There are two reasons why the profit due each employe was paid in the form of notes rather than by giving them the cash. First—by this method he is forced to save at least that amount for at least a year, which is in itself desirable. At the end of the year, he may either continue to let this amount remain in the company as a desirable investment, or if he so desires he can receive cash for his note. Second—he becomes an investor in the company, and his interest in the welfare of the company is probably to that extent stimulated. Since 5 per cent is paid capital prior to determining the amount of profit, these notes are also paid 5 per cent inasmuch as they are as much capital as any other money invested in the business of the company. Further, these notes share in the profit in the same way as any other capital shares and as briefly indicated; the workman, therefore, realizes that he is sharing in the profit of the company both as a laborer and as a capitalist insofar as the amount of his note represents capital. Incidentally, by paying this profit in the form of a note,

EDITORIAL NOTE

We have stated to Mr. John Rice, President of the General Crushed Stone Company, that we consider this one of the most valuable articles it has been our privilege to give to the industry for a long time. But while this matter was given some publicity in Easton at the request of local people, it has been with some reluctance that Mr. Rice has consented to having it presented to the industry in general, because of the fact that while it is comparatively easy to state concrete facts, it is much more difficult to convey an impression of the underlying motives prompting such action. Those who are acquainted with Mr. Rice will not need to be told that the thought back of such action as is outlined by Mr. Graves is a sense of personal responsibility in industrial relations, without specific regard to whether it is a good business move or otherwise.

Mr. Rice points out that hundreds of corporations have done more in a material way for their men than his company has done or contemplates. The aim has been, however, to avoid any suspicion of paternalism or so-called enlightened selfishness, but to deal justly with employes as man to man. And at this point, we hope Mr. Rice will allow us to quote from a purely personal letter:

"The thought is founded on the idea that if we follow our finest instincts this motive will be imparted to the men and develop in the men their best instincts and produce a condition of helping each other to better things, rather than endeavoring to find out how we can get from each other the material advantages of life. It is our earnest belief that the success (using success in its largest sense) will be just in proportion to the material disinterestedness of our own purposes. If it be a mere expediency by which we can secure better relations with our men, then the self-interest will ultimately become apparent and the purposes will be defeated. It is also a deep founded confidence that reasonably material success will follow the method because we sincerely believe that that which is inherently right must prevail. We of course recognize the necessity of keeping a proper balance between the practical and the emotional side of any effort of this kind. In other words, we cannot let up on our own efforts and hard work, nor can we expect to keep moving along serviceable lines unless the men will give their reasonable energy and industry to their occupation.

"We have no thought that we have found a Utopia in which we can all sit down and be good and thereby be happy and have enough to eat, but we are very confident that if we do our part as man to man our men will necessarily in time absorb the same spirit as their own understanding develops and we will move along harmoniously to happier conditions of life."

In this plan of industrial relations the profit sharing phase is only incidental. It was conceived merely as a "material expression of good intent," rather with the idea of fixing attention than for the material benefits which might result. Mr. Rice points out that when all the profits of industry are divided in any fair proportion among all the men, it is rather insignificant at any rate, but it at least has the suggestion of fairness and is the simplest line of approach to the understanding of the average man.

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the working capital of the company is not impaired.

2. If it is accepted that the employes have a right to share in the profits of the company, then it follows logically that they have a right to a voice in the management of the plants in order to properly assist in creating a profit in which they have a right to share. In order that this voice may be expressed in a convenient manner, the men at each plant are requested to elect a committee of three men to meet informally and as occasion arises with the superintendent and the representative from Easton, is free to discuss any matter or problem affecting the men, the company, or the production of the plant. They can discuss the question of wages, working hours, living conditions, conditions about the plant, methods of increasing

production, of operating more economically, or any other question which is of interest to them. This discussion is not merely idle expression of opinion; but whenever any suggestion is shown to be right and proper, we endeavor to assist in putting it into execution, if it is at all feasible. The meetings of this committee are held with sufficient frequency to remove any undue formalities or awkwardness in the discussions.

3. It is agreed that the conditions under which a man works should be made as comfortable and pleasant for him as the nature of his work permits. This could be carried to an extreme which would render it merely absurd; but it is interpreted in a commonsense, practical way, constantly bearing in mind that a man works more happily, contentedly, and therefore more efficiently, if he is as comfortable as the kind of work that he is doing permits him to be.

The three principles indicated above are already in operation and it is the hope that the two following can soon be installed. The question of how soon they can be made effective is dependent upon the attitude of the men themselves and this has been clearly stated to them.

4. A man should be paid even though he is sick and unable to work. When a man is ill he is in greater need of money than when he is well, because of obviously increased expenses.

5. With particular reference to the so-called common laborer and those men on an hourly rate, it is believed that they should be paid for time lost due to conditions beyond their control, such as rain, car shortage, plant break downs, etc. It seems unfair to a man who has agreed to work for you at an hourly rate and who is expected to come out every morning and work until the close of the day's operation, to dock his time for any portion of that day, if he was prevented from working by conditions similar to those just noted.

In explaining to the men our belief in the moral justness of these principles, we do not fail to emphasize the fact that each thing which belongs to us as a right must necessarily be accompanied by a corresponding responsibility and obligation. Each of us realizes, as a matter of course, that the laws of the community in which we live entitle us to protection in various ways. No man, against our will, has a right to come in our front yard and dig up the sod in search for angle worms for bait on a proposed fishing expedition. On the other hand, we must respect the right of others to prevent our committing a similar act of vandalism. We have placed, in talking to the men, particular emphasis on the obligations accompanying the rights which we believe are theirs. If, for instance, it is accepted that each employe has a right to share in such profit as the company may make, he is under the obligation of doing his fair and honest part to create such a profit. The responsibility accompanying his right to a voice in the conduct or management of the operation is that he will use this voice properly and wisely and considerately, being as much interested in ascertaining the views of his employer as he is in explaining his own. The same obligation, of course, rests upon the employer. If he feels, as do we, that it is his right to be paid if he is prevented from working by sickness or weather conditions, etc., he should hold himself ready and willing to occasionally work overtime when the exigencies of the operation may demand, without expectation of additional pay for this time.

It should be observed that it is difficult to reduce ethical principles to a formula or system. We are merely endeavoring in a straightforward

way to examine ourselves to make sure that we are doing our part in that relationship which exists between capital and labor, believing sincerely that such an attitude on our part will result in a similar reaction on the part of labor. We are not unmindful of the danger of overemphasis of the profit-sharing part of this conception of things, inasmuch as there are factors entering into profit and loss which are beyond the control of the plant employes. They might be doing all in their power to insure a profit but adverse conditions might prevent the desired result. If excessive emphasis had been placed, therefore, on the profit-sharing thought, the news that no profit had been made would be rather puzzling and would perhaps result in a rather sickening thud, as their artificially stimulated hope of profit collapsed. The various factors entering into a successful prosecution of the business are, therefore, made as clear to the men as possible, our attitude simply being that if there is a profit, whether large or small, we believe that they are entitled to a fair share of it.

These ideas were presented to the men at the various plants early this spring and sufficient time has not yet elapsed to render possible any reliable opinion as to the probable effect of this way of working. We are also aware of the danger of basing definite conclusions on insufficient data; but so far as we have gone, little things about the plants tend to show that the men are far from unresponsive to this line of thought, nor are they disinclined to believe that we are prompted not by material motives of expediency but are rather trying to conscientiously fulfill our part of what we conceive to be our mutual moral obligations.

The Waukesha Washed Sand & Gravel Company, has purchased the plant of the Okauchee Gravel Company, at Okauchee, Wis.

Chemistry in the Sand and Stone Business

CHEMISTRY is still classed as a science, but its value has been proven in a hundred ways as an adjunct to business. It plays a decided part in both stone and sand production, and many an operator may be letting money slip through his fingers by not consulting a chemist and having an analysis made of his products.

Only recently the writer found that a producer had been selling a deposit of sand to the building trade at a small profit. Samples submitted to a chemical laboratory showed this sand was 95 per cent silica, as a result of which a market was found for the sand among glass manufacturers at more than double the price.

The same thing has repeatedly occurred in connection with many kinds of stone. Know the chemical analysis and all the physical properties of your products. You may have a "gold mine," figuratively speaking, and not know it. Andrew Carnegie has been reported as stating that many of the millions he made was through information furnished by the chemists he employed.

New Members

The following firms have recently taken out membership in the National Crushed Stone Association:

The Weston & Broker Co., Columbia, S. C.

H. E. Fletcher Co., West Chelmsford, Mass.

The Morris County Crushed Stone Co., Morristown, N. J.

The Ohio Marble Co., Piqua, Ohio.

The Higgins Stone Co., Bellevue, O.

North Philadelphia, Ohio, will have a new sand company, the Martin-Arnold Sand Company being the name of this new firm, which is composed of E. S. Martin, C. E. Wood and J. B. Oviatt.

A Letter from President Johnson

TO Sand and Gravel Producers:

I have just returned from Washington, where I had, in company with Mr. Sutton and other officers and members of the Association, a most unusual opportunity of sizing up existing conditions. The rate hearing was important, and we left well satisfied with the showing we had made, feeling that whether immediately successful or not, we had been instrumental in securing for our commodity, rates more nearly commensurate with the averages of others than we otherwise would have had.

Everyone felt, however, that the matter of car supply at this time overshadowed everything else, and especially after the priority order issued by the Commission in favor of coal, we were confronting a situation fraught with most serious consequences—not only to our own, but to all construction industry. We had many conferences with railroad and shippers' associations, officials and secretaries of other associations, traffic experts and government employes; we heard much testimony as to conditions throughout the country, and we have had opportunity in traveling to make personal observation of railroad conditions, especially with reference to coal. There is but one conclusion possible in view of all the testimony, and that is, that this reconstruction seems to have been started by going backward. Transportation facilities are sadly demoralized as to equipment, finances and labor. Financial conditions throughout the country are far from stable. Industry generally is very slow in getting on a peace-time basis. Labor is indifferent to its place in industry and inefficient.

I left Washington after reading the priority order issued by the Commission in favor of coal. This action was so unexpected and seemed, in view of all conditions, so unnecessary and unwise, and so serious a blow, not only to us, but to all construction industry, as to fully warrant the opinion shared by those present, that our fight for a fair share of transportation had only begun. It seems incredible that the action taken was based on full knowledge of the facts and was made with any foresight as to its inevitable consequences. Every one admits that the railroads have fallen down under the burden placed upon them, and there seems to be no really constructive, intelligent effort to remedy the situation. I am no pessimist, nor do I desire to alarm the members of our industry who look to me for information, but I do take it as part of the duties of my office to advise you of the facts which we must face, and impress upon you as never before the necessity for co-operation.

The situation is complicated, and no offhand, speedy or simple solution of the problem is possible. Since there are in it elements of ignorance, indifference and inefficiency, it will take time, it will take thought, and it will take a real pooling and concentration, not only of effort, but of money. Even as we spent of these to win the war, so now must we spend again, not only to secure our own rights, but to re-establish the balance of industrial relations. Slackers must be eliminated; profiteers must be made righteous; the ignorant must be made to see the light. It is a large program and calls for as high a degree of real patriotism as that of war days.

Mr. Sutton will remain in Washington indefinitely. We had a sizable delegation from all parts of the country present during the rate hearing, and we pulled every available string to secure more attention to our need

for cars. We have been in touch with the Senate Committee on Reconstruction; we have talked to different members of the Commission on Car Service; we have had an opportunity to observe and pattern after the methods of the National Coal Association; we have had the active support of the Portland Cement Association; we are endeavoring to enlist the co-operation of the National Federation of Construction Industries; we have had advice on and considered the feasibility of court proceedings. We have come to realize that there is much ignorance with reference to our products and their importance in the industrial world, and that, regardless of immediate results, we must conduct a campaign of publicity and education.

We are now planning for a general conference of representatives of construction industries at Washington. We are also arranging for a special hearing before the full membership of the Interstate Commerce Commission. We are co-operating with state highway officials, with the Federal Bureau of Public Roads, contractors' associations and many others. Without going into detail, which would take an undue amount of space, we have been keeping things hot and are far from the limit of our resources yet. Every one conversant with the facts feels that we must fight, and fight vigorously at this time or not at all. A month from now will be too late.

We need the active co-operation of every producer in the country. I am satsified that if each one knew the situation, he would not hesitate to align himself with us. Up to date the burden has been carried by a comparatively small per cent of the producers, and unless the producers generally get in line, our efforts will be crippled and all will suffer accordingly. This is not a time to quibble about a little effort or money. If those of us who know the facts consider it to our interest to donate our time and considerable money, why not take our example as a guide for your own actions? Some have already been generous in their support; the big majority, however, are still holding back. I am satisfied that if this attitude continues, it will cost you hundreds for each dollar you withhold at this time.

Remember, I am no paid employe, seeking to bolster up my own position or the affairs of this Association. On the contrary, the greater our finances, the more extensive our activities will be, and the more time I will be called upon to spend at nothing a year in this work.

We ought to hear by wire and letter from every producer to whom this communication goes, stating just what conditions are at his plant, and enclosing a substantial check, with the promise of more if needed. If you will do this, we will be able to give you big value for your money. If you fail to do it, the consequences are yours. Very truly yours,

V. O. JOHNSON,

President, National Association Sand and Gravel Producers.

June 25, 1920.

The Foreman

SO important is the foreman considered in modern industry, that at the recent Chicago convention of the Industrial Relations Association of America a whole session was devoted to him. And why not? He is the point of contact between management and men. He can make or break almost any organization. Unless he is alert, open-minded, loyal, resourceful, no concern can approach its greatest possibilities. Watch for the man who can be developed into a good foreman — and keep him when found!

Before the Commerce Commission

Sand and Gravel Producers Make Plea for Adjustment of Rates

AT a hearing before the Interstate Commerce Commission held at Washington, June 19, the National Association of Sand and Gravel Producers, through O. P. Gothlin, attorney, presented a petition urging the commission, in the event increased rates were allowed the railroads, not to permit a blanket advance in all rates, without distinction, holding that such a course would be unwise and unjust and would cause hardship and injury to many industrial interests, especially sand and gravel.

The brief stated, among other things, that there are three kinds of transportation rates in existence today: Those that are fair; those that are excessive, and those that are preferentially low. "We assert as an incontrovertible fact," the brief added, "that if the carriers will eliminate all preferential rates by advancing them to a just and reasonable basis, they will not only enhance revenues sufficiently to meet their needs, but will also be able to reduce, to some slight extent at least, the undue burden now weighing heavily on certain producing interests, particularly that of sand and gravel."

Producers of stone and cement were granted a hearing June 21, and the arguments they presented were along the same lines. As with the sand and gravel producers, there was no direct opposition to the proposed advance in rates, the argument being largely that there should be a readjustment of present rates and a proper application of the advances so that all industries would be affected alike and none be favored.

The brief filed by the sand and gravel men showed that rates on those commodities are just about double what they were in 1916, except as to a few long haul rates, and that there is no need for a further advance in sand and gravel rates. It was also claimed in the brief that "one vested with authority could, in a very short time, publish tariff changes that would add 30 per cent (the approximate advance asked by the carriers) to the revenues and hurt nobody. The advances made would be merely putting the shipping interests affected thereby on a just and fair basis. The rate structure is honeycombed with inequalities." Charging that the carriers are paying little or no attention to the criticism of the commission of the existence of some rates, the brief says:

"Apparently carriers paid little attention to the suggestion of the commission, for there are still in existence numerous rates to which the commission's criticism will apply. And this notwithstanding there have been several advances in rates since 1914. We therefore feel that we are justified in requesting that, instead of being accorded authority to make a general advance, thus accentuating the existing discriminating adjustment and imposing further burdens on commodities already carrying more than their share of the transportation tax, carriers be required to equalize freight rates and bring up to a proper level those rates that are below that level and which do not return a fair share of the necessary revenue. We believe if this is done, carriers will receive revenue ample for their needs.

"General Order No. 28 should not have been issued in the form that it was issued. The Railroad Administration had a magnificent opportunity to do a great work for the public welfare in line with the intent of transportation regulation. In a very short time thousands of the then existing unduly

low rates could have been canceled and reasonably compensatory rates substituted therefor. The effect of this would have been adequate revenue and no interference with business. A greater result would have been the elimination of a large measure of the existing discrimination.

"But the administration failed to grasp its opportunity. Instead, it issued General Order No. 28 imposing a blanket advance, and worse than that, applied arbitrary flat ton advances on some commodities, the result being that low value, short haul freight, the least able to stand the advance, bore most of the burden. Road construction contractors were caught in a vise and great loss resulted. Exactly the same thing will happen if a further advance is imposed on sand and gravel.

"The commission now has the opportunity the Railroad Administration failed to grasp. A glorious opportunity to achieve a great reform in the field of transportation. Your experts can locate the rates that should be advanced and embodiment in tariff form of the necessary charge can be expedited, if the commission orders, as to afford quick relief to the carriers by enhanced revenue, and this without imposing further burdens on those industries now paying more than their share of the tax."

Comparing costs of material with rates, the brief says:

"Gravel is a very cheap commodity; probably the lowest priced commodity shipped. It is worth f. o. b. cars at point of shipment about 60 cents per ton. Even coal, which is a comparatively cheap commodity, is worth from six to eight times as much as gravel. Furthermore, sand or gravel cannot be damaged by transportation hazards, unless it be dropped into a river. It cannot be burned; it is unaffected by weather. No liability attaches to the transportation, which can be said of no other commodity. The hauls are short, which makes frequent use of the car possible. But it is a commodity that cannot stand high rates. If it moves at all, it moves on low rates; but rates that are highly profitable to the carrier. Very little of it moves at more than $1 a ton. To add to the existing rates the advances proposed would mean rates in excess of $1 per ton for movement of less than 75 miles. Undoubtedly such advance would materially reduce road building—a prospect that cannot be contemplated with indifference."

Referring again to General Order No. 28, the brief concludes:

"General Order No. 28 created a glaringly unjust discrimination against sand and gravel in favor of slag, a directly competing industry; that rates on sand and gravel are generally from 30 to 50 per cent higher than rates on slag, a situation that cannot be justified."

In a general way it was shown in the brief that an increase of $1,000 a mile in the cost of road building would result if the requested advance is applied to sand and gravel, while at the same time it was shown that today it costs $1,200 a mile more than it did in 1916 to build a road, due to increased freight rates. Local communities throughout the country are endeavoring to improve and extend their good roads under the guidance and influence of the good roads bureau of the Department of Agriculture. Government experts agree that added transportation costs will have an adverse effect on this activity.

Building activities would also be badly handicapped by an increase in rates, the brief held. It was pointed out that regardless of the grave shortage in housing facilities, especially in the larger cities, brought about by the prohibition on building during the war, builders are awaiting the lowering of prices before attempting to meet this need. Present freight rates on sand

and gravel, the basic building materials, are approximately the equivalent of the cost of these raw materials at the point of production, and an additional 50 per cent, it was shown, would considerably lessen the now limited building activities.

After the brief had been read and filed with the commission, V. O. Johnston, president of the association, addressed the commission on the car shortage subject. He made it plain that the sand and gravel producers are being discriminated against in favor of the coal industry. He explained that construction work represented 47 per cent of the country's business, and that sand and gravel are two of the most important basic materials used in the construction of roads and dwellings. He insisted that everything should be done to assist, rather than hamper, the production and movement of sand and gravel. He pointed out that on practically every rail line in the country, thousands of open top cars were lying idle, or filled with coal, were choking traffic because of the vast number of cars used in moving this one commodity.

Prior to the hearing the advisory council of the association met, at which procedure at the hearing was discussed and decided upon. Those who attended the advisory council meeting, most of whom also attended the hearing, were: President V. O. Johnston, Lincoln, Ill.; Harry Donnelly, Cincinnati; W. P. Carmichael, St. Louis; Floyd Goodrich, Humboldt, Iowa; Alexander W Dann, C. C. Whiteside, E. Brooker, Charles Donley and Joseph Hoeveler, Pittsburgh; Hugh Haddiw, Jr., Milville, N. J.; R. C. Fletcher, Des Moines; Ben Stone, Frank E. Lane and Nathan C. Rockwood, Chicago; John Prince, Kansas City, Mo.; O. C. Hubbard, Milwaukee; A. E. Shellberg, Omaha; John M. Settke, Louisville, and E. Guy Sutton, secretary.

This Is What It Says

Preferential Treatment Accorded Coal for a Period of 30 Days

THE following is the text of Service Order No. 7, issued June 19, by the Interstate Commerce Commission:

It appearing, in the opinion of the Commission that because of a shortage of equipment and congestion of traffic, aggravated by unfavorable labor conditions which continue to exist upon the lines of each and all the common carriers by railroad subject to the Interstate Commerce Act within the territory east of the Mississippi River, and because of the inability of said common carriers properly and completely to serve the public in the transportation of coal, an emergency exists which require immediate action;

It is ordered, that such common carriers by railroad in the aforesaid territory which serve coal mines, whether located upon the line of said railroad or customarily dependent upon it for car supply (herein termed coal-loading carriers) be, and they are hereby, authorized and directed for the period of 30 consecutive days beginning with June 21, 1920, to furnish such coal mines with open top cars suitable for the loading and transportation of coal (herein termed coal-cars) in preference to any other use, supply, movement, distribution, exchange, interchange, or return of such coal cars; *provided*, that such coal cars may be used in service moving in the direction of the mine or mines to be supplied, on the return movement, after the discharge of the coal loading thereof, upon a route not materially out of line and to points not beyond such mine or mines.

It is further ordered, that all common carriers by railroad within said territory other than coal-loading carriers, (herein termed non-coal-loading carriers) be, and they are hereby authorized and directed during said period to deliver daily to a connecting coal-loading carrier or carriers, empty or loaded coal cars up to the maximum ability of each such non-coal-loading carrier to make such deliveries, and of each such connecting coal-loading car-

rier to receive and use the coal cars so delivered for the preferential purposes herein set forth.

It is further ordered, that all such common carriers by railroad within said territory be, and they are hereby, authorized and directed forthwith, and during said period, to discontinue the use of coal cars for the transportation of commodities otherwise than as hereinbefore specified (a) as to each coal-loading carrier, so long as any coal mine remains to be served by it with coal cars and (b) as to each non-coal-loading carrier, so long as deliveries of any coal cars to connecting carriers may be due or remain to be performed under the terms of this order.

It is further ordered, that all common carriers by railroad within the territory hereinbefore described be, and they are hereby, authorized and directed, effective June 23rd, 1920, and until the further order of the Commission, to place an embargo against the receipt of coal by any consignee, and against the placement of coal cars for consignment to any consignee, who shall fail or refuse to unload coal placed for unloading within 24 hours after such placement, until all coal so placed has been unloaded by such consignee, *provided*, that this authorization and direction shall not interfere with the movement of coal under permit to any coal pool or pools, when authorized by any order heretofore or hereafter entered by the Commission.

It is further ordered, that all rules, regulations and practices of said carriers with respect to car service are hereby suspended in so far only as conflicting with the directions hereby made; and that the authorizations and directions herein contained are to be considered as not conflicting with or superseding any Service Order heretofore entered by the Commission.

And it is further ordered, that copies of this order be served upon the carriers hereinbefore described, and that notice of this order be given to the general public by depositing a copy thereof in the office of the Secretary of the Commission at Washington, D. C.

The Washington Silica Sand Company, Washington, Ohio, has increased its capitalization from $75,000 to $100,000.

Annual Michigan Meet

State Well Represented—Ray Is Again President

THE annual meeting of the Michigan Sand and Gravel Producers' Association was held recently at the offices of the United Fuel & Supply Co., Detroit.

Producers from every section of the state were present.

Reports were to the effect that due to car shortage for the transportation of sand and gravel, building operations were being seriously held up.

Officers for the ensuing year were elected as follows: President, C. N. Ray, Detroit; vice-president, G. A. Glarum, Evart; secretary and treasurer, George L. Earle, Detroit.

Fire swept the stone crushing plant of the Union Stone quarry of John E. Baker & Co., at New Holland, Pa., causing a loss of $30,000. The fire apparently started in the boiler room, and had evidently spread considerably before discovered, as three men were working in the building at the time. Although the building was equipped with fire extinguishers, the frame construction of the plant made it an easy prey to the flames. It is, however, covered by insurance.

W. J. Swegman, graduate engineer, has affiliated himself with the J. C. Buckbee Company, of the First National Bank Building, Chicago. J. C. Buckbee Company are well-known in the engineering field, and in securing Mr. Swegman as a member of their staff, are to be congratulated, as he has had wide experience in the designing, building and operation of cement plants, as well as plants for crushing and grinding other materials. He has done considerable work in power plant construction and general engineering. Mr. Swegman is a graduate of Purdue University, class 1906, and his first position was with the Superior Portland Cement Co.; thereafter he did work for the Texas Portland Cement Co., Freeborn Engineering Company, Ebro Irrigation and Power Co., Barcelona, Spain.

Some Unusual Features

New Plant at South St. Paul Getting Out 1,000 Tons Daily

ON the opposite page are shown illustrations of the new plant of the United Materials Company at South St. Paul, Minn.

This company, of which F. J. Morse is president and Bernard S Andrus treasurer and manager, is producing road gravel, plastering sand and concrete sand, the new plant having a daily capacity of 1,000 tons.

It will be seen from the cuts that the plant has some unusual features, notably its nearness to city population and paved streets, and the fact that the gravel is taken by motor truck from the bank to the hoppers.

Regarding the plant, Mr. Andrus writes:

"The hauling of materials from the pit to the plant by means of auto trucks was necessitated by the fact that there is a paved street, with street cars, interurban cars and considerable automobile traffic between our pit and plant. Our plant had to be located across this street to get trackage facilities. The trucking of material has worked out very satisfactorily for the reason that we have a number of trucks on hand at all times to take care of local deliveries and we use as many as necessary to keep the plant supplied and send the others with deliveries when required. We keep two trucks on the hauling from the pit to the plant most of the time and sometimes use an extra one when we remove strippings or crowd the plant. The cost of delivery is about 7 cents per cubic yard, and the trucks can handle about 400 cubic yards per day each. We have used several different makes of trucks on this, but find the lighter types better suited to the work.

"We have a ¾-yard Erie steam shovel to load the trucks. Our screens are of the vibrating type, and we are dry screening. The material in our pit, which is a glacial deposit, is absolutely clean and washing is not required.

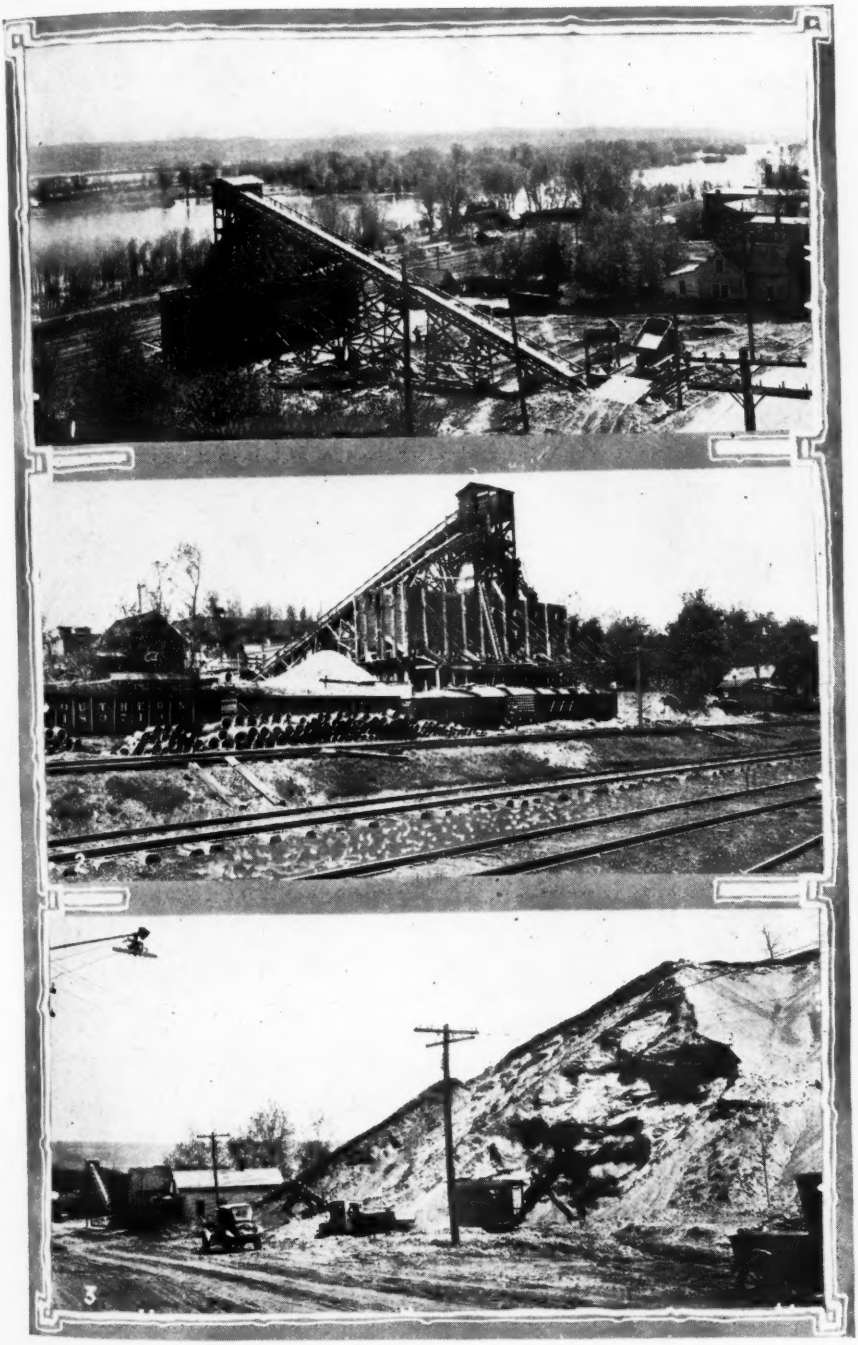
"Our plant is operated by electric motor, this being so arranged that the one motor drives all screens and the conveyor belt, as well as the feeder-belt under the charging hopper at the side of the street.

"The location of our plant is such that we can handle the local trade of St. Paul, as well as South St. Paul, we being situated on a well paved street, at a distance of three miles from the business district of St. Paul and one mile from the business district and stock yards in South St. Paul.

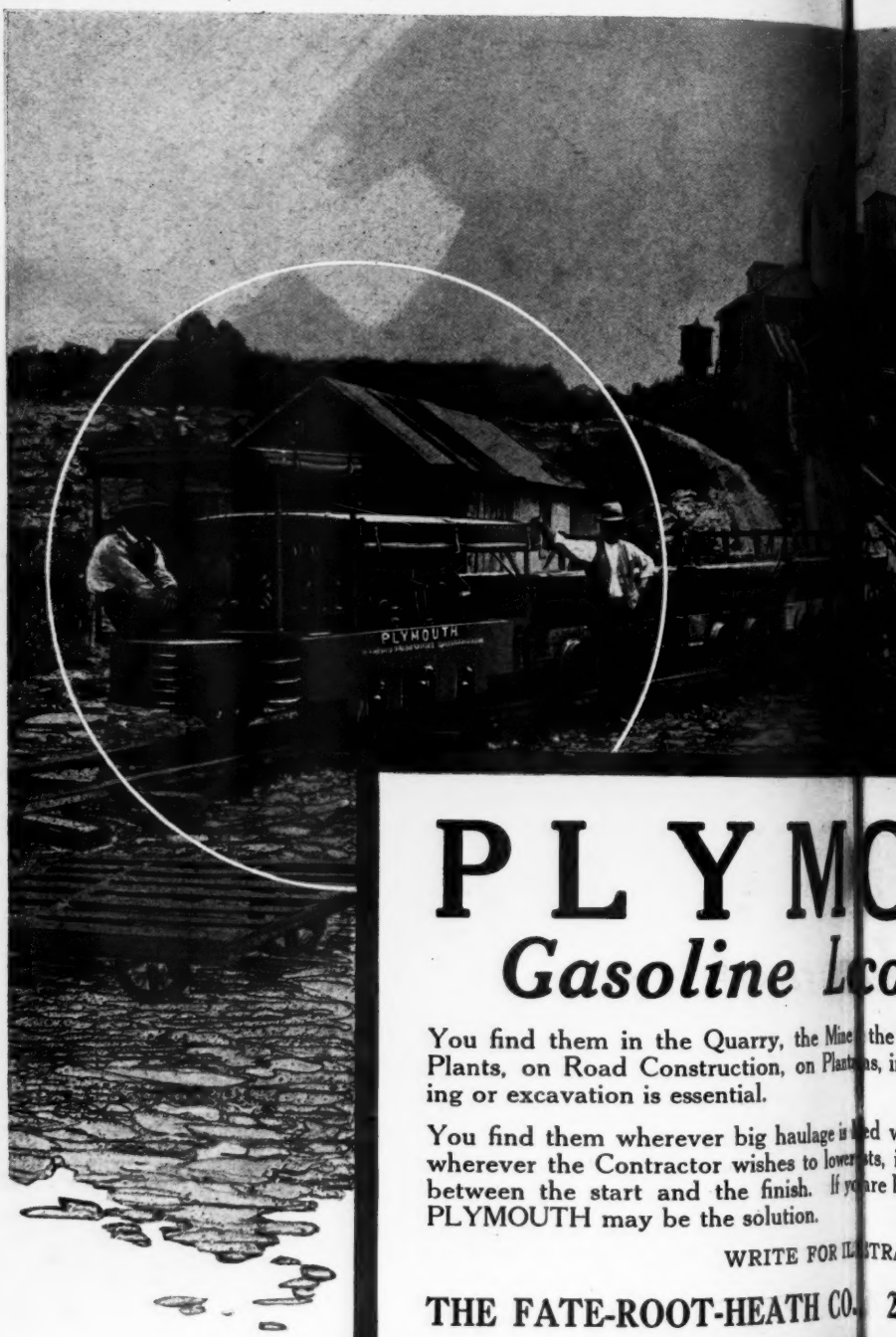
"The property from which we are taking our material will be valuable as city lots when the deposits are removed, it being a district where there are a great many buildings already.

"A further feature that may prove of interest to your readers is the fact that we have uncovered a great many Indian graves since we started operations and quite frequently we discover bones and relics as we progress farther into the hill."

At Syracuse, Ind., the Sandusky-Portland Cement Company is investing $150,000 in transforming the equipment of the works for the manufacture of cement from limestone instead of marl, as heretofore. Limestone in large quantities will be shipped to Syracuse from Logansport and other Indiana towns. The last general assembly of Indiana passed a law enjoining the Sandusky Company from operating dredges on Lake Wawasee. The smoke from the dredges elicited complaints from the cottage owners, and after a protracted and strenuous fight they secured passage of a law directed at the industry. Following that time the Sandusky plant has been idle.



Sand and gravel plant of the United Materials Co. at South St. Paul, Minn.



PLYM

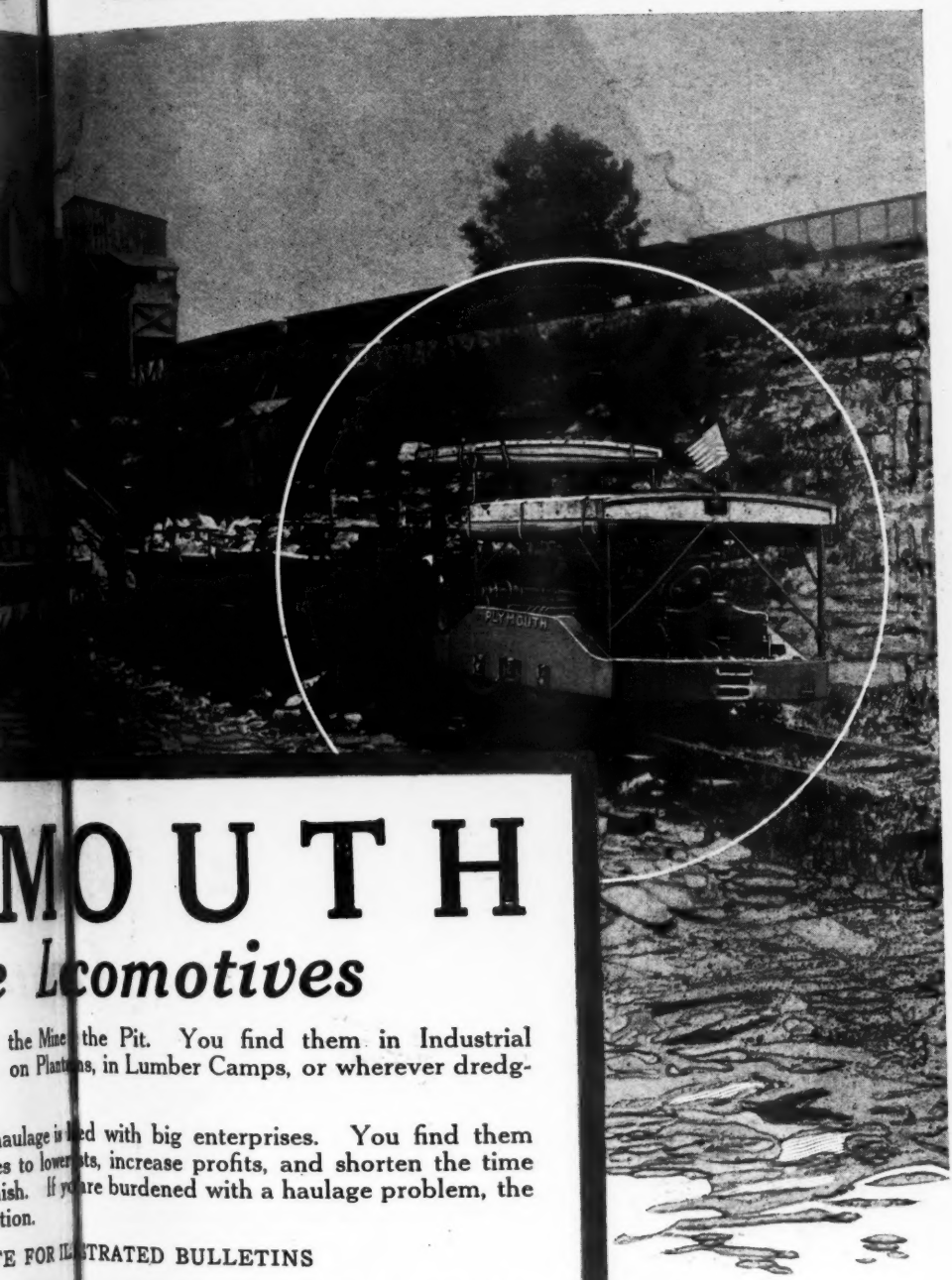
Gasoline Lo

You find them in the Quarry, the Mine the Plants, on Road Construction, on Plant as, i ing or excavation is essential.

You find them wherever big haulage is ed v wherever the Contractor wishes to lower sts, between the start and the finish. If y are PLYMOUTH may be the solution.

WRITE FOR IL STR

THE FATE-ROOT-HEATH CO. 2



MOUTH

e Locomotives

the Mine the Pit. You find them in Industrial on Plantations, in Lumber Camps, or wherever dredg-

haulage is ed with big enterprises. You find them es to lower ts, increase profits, and shorten the time ish. If you are burdened with a haulage problem, the tion.

E FOR ILLUSTRATED BULLETINS

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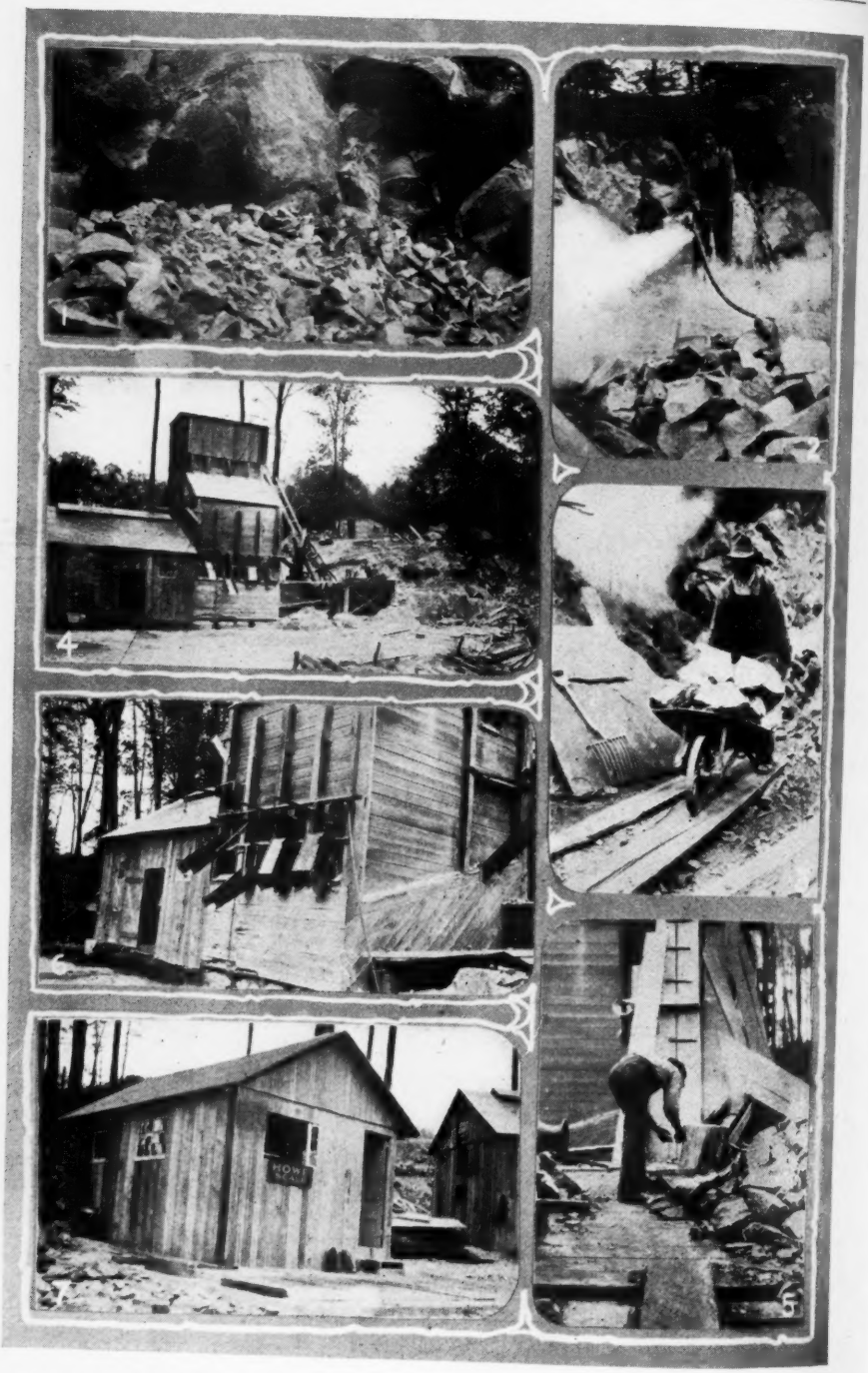

Preliminary operations at the plant of the Delaware Granite Co., Wilmington, Del.

Quarry Pays Its Way While Under Construction

WERE are many ways of starting a quarry proposition. Operators will vary as to this, each one doing it in a different manner. In most cases the size and type of plant is decided upon and then built. By this method a large expenditure is made and some months of time consumed before there is any return.

In a new quarry operation started this year in the suburbs of Wilmington, Del., by the Delaware Granite Company, this general method has not been followed, but instead a small crusher plant has been installed and put in operation, while a larger plant is being planned and built.

This procedure is worthy of note, as it presents some features which promise to make it pay quicker dividends, possibly saving money in the development of the quarry. Besides these interesting features, one other unusual thing has been done in making a survey of the quarry ledge and running levels over it, besides sinking numerous test pits over the area to estimate the probable yardage of the overburden and obtain the actual amount of rock at a given point, together with its quality.

This would seem the obvious thing to do in developing any quarry; yet in too many cases the custom is more honored in the breach than in the observance. When done it means that the quarry operator has that intimate knowledge of his project that allows him to deal with facts, instead of making rough estimates and guesses. In locating the plant, it means the best possible location; in operating, it means the saving of much money. More and more operators of pits and quarries are realizing these facts, as evidenced by the engaging of engineers, economists and other experts to do this work and give advice. The quarry company which is doing these things is to be commended for its foresight and business judgment.

The quarry in question is located on the Baltimore & Ohio Railroad and arrangements are being made to build a side track into the plant. A highway for wagons and trucks is also being built into the quarry. Crushed stone from the present plant is being used to build this highway and its branches. This alone is saving much money; for not only can heavily loaded vehicles with machinery enter the quarry, but larger loads of crushed stone and other products can be carried out.

The stone is a dense volcanic rock, locally known as granite. It is extremely hard, good for roads and many other purposes, and is easily worked into dimension and building stone. The area covered by stone consists of two hills with a slight depression between them through which runs a small brook. The first hill, the smaller one in area, is the present site of operation, and where the ledge is opened up, shows a height of 20 to 25 feet, as shown in Fig. 1.

The drilling of the ledge is done with steam drills, there being in use an Ingersoll-Rand F, the same make baby drill mounted on a tripod, and two of the same make jack-hammer drills. These last are also operated by steam, as is shown in Fig. 2. Naturally air gives better results and is easier than steam on the operator, but the question is frequently asked by quarrymen if hammer drills work successfully with steam. The answer is given here, showing the drill plugging a large boulder preparatory to block holing it.

All the blasting is done with Du

Pont dynamite, straight shooting being the rule. The stone, naturally hard, is broken into large boulders which are broken up by means of explosives and large sledge hammers. As the stone is broken up, the sledgers pile it up behind them as shown in Figs. 1 and 3. This keeps the foot of the ledge free of spoil and also allows the ledge to be breasted up well at the toe so as to allow good blasting of the ledge to be done.

In Fig. 3 is shown a man with a barrow wheeling the stone from the piles to the crusher. The distance is less than 50 feet. Now that it is getting longer a winch has been placed on the feeding platform and cars are being installed. These are two-way dump cars holding from 1 ton to 1½ tons.

The quarry has only 2 or 3 feet of overburden, except where pockets of dirt occur. This stripping is done by hand, the dirt being hauled away in dump carts. The dirt is used to fill low places and grade the necessary roads to the quarry.

The crusher being used is a Champion No. 4 jaw crusher, 9x15-inch with a rated capacity of 12 to 18 tons per hour. The power is furnished by what was formerly a portable 18 H. P. Farquahar boiler with an Atlas engine mounted on the boiler. The boiler was taken from its wheels and mounted on a concrete base with a brick ash box placed under the fire box. In the boiler room shown in Fig. 4 there is also a blacksmith shop for sharpening the drills. This boiler also furnishes the steam for operating the drills.

The crusher is fed by hand, as shown in Fig. 5, the man using his hands, a stone fork and a shovel. The elevator, housed in, is also shown in Fig. 5. Also at the side can be seen the chute that brings the tailings from the screens back to the crusher.

Fig. 6 shows the chutes in the side of the bins for loading wagons and trucks. The chutes were placed too low and it will be noticed that one has been raised up to do better work. The others are also to be raised. In building the bins the flow was laid at an angle of 30 degrees, but it was found that the stone would not run on such a slope and a false flow was put in at an angle of 52 degrees. This necessitated raising the screens and building the head house 10 feet higher.

Fig. 7 shows the scales for weighing the trucks as they leave the quarry, and also the office building, a part of which is used as a tool and supply room.

The new crusher plant is to be located in the swale between the two hills of rock and close to the B. & O. Railroad. A siding is to be put in, connecting with the railroad, and a road for trucks is to be built to the bins.

Two Farrel 16x20-inch crushers are to be installed, and also a Traylor crusher. This plant is to be operated by electricity, Westinghouse motors have been purchased for this purpose.

It is expected to have this plant, which is to have a capacity of 300 to 400 tons daily, completed and put in operation this season. As this is being done a profit will be made by operating the small plant and getting out and selling building stone.

This building stone business is a large one in many eastern cities. One and two men size stone are broken up by sledges and sold by the ton or perch. This line allows of stone being quarried during the winter and sold in the early spring. It also means that with small crushers much stone that would have been broken for the crushers are sold as building stone, thus saving money in the entire operation.

The Lake Ontario Sand Company, Rochester, N. Y., has increased its capital stock from $17,000 to $75,000.

Helmets Protect From Falling Rock

Many Accidents Are Prevented by Resistive Head Covering

THE use of helmets during the war has accentuated interest in the advisability of using stiff hats in mines to protect the miners against falling rocks. About 40 per cent of the accidents in mines are due to falling rocks or roof. A large number of these accidents could be prevented if the miners wore stiff hats or helmets.

The use of head protective devices in mines is not new, for they have been in use for many years in Europe and in the Lake Superior district in the United States. In practically all of the mining districts in Europe stiff hats of some kind are required by the mine management. George S. Rice, chief mining engineer of the bureau of mines, reported that in Germany, Belgium and France stiff hats made of papier mache or felt rosin are in use. Similar hats are generally employed in the Lake Superior district. In building the subways of New York and Philadelphia it was the practice of engineers and workers to let the hair grow very long and to wear a close fitting cap or felt hat. In Germany the hats are high like the military helmets, whereas in France and Belgium they fit more closely to the crown. In England the practice is mixed. As a rule, the miners use soft padded caps, but in Yorkshire many of the miners use sole leather, tight-fitting caps of jockey pattern with the seam forming a little ridge down the middle of the cap. These hats are very useful on low, thin beds of coal, as in crawling one is very likely to strike his head on a sharp piece of rock or on a timber. Of course, such mishaps are more likely to occur to a man not familiar with the mine. It must be admitted such hats do not stick on well, though this is usually due to their not being especially fitted. The German hat is particularly unsuited to an American-shaped head.

It is interesting to note that on the continent tight cotton caps are generally worn over the hair and under the hard hat. This is a measure for cleanliness which is excellent. In low beds of coal, where much crawling on hands and knees is necessary, the dirt and coal dust sift down, making the miner black and dirty. In metal mines stiff hats are of especial use in shaft work; also in raises or high stopes. A small fragment of rock falling some distance, either down a shaft or raise, would kill a man if it struck him squarely on the head. A stiff hat or helmet may protect him and save his life. At a station in a shaft where men are loading the cage or skip, some kind of adequate head protector should be compulsory. A head-protecting hat or cap which is also a good insulator should be worn where there is danger of striking one's head against a wire carrying an electric current.

As a rule, miners are more willing to take chances than to wear a cumbersome or hot device. The European miners have become so accustomed to the use of a head-protecting device that wearing one has become second nature to them. It would be desirable if stiff hats were in more general use in our mines.—**U. S. Bureau of Mines,** Reports of Investigations.

The pyrites market continues to hold very firm in tone on account of the comparatively small supplies which are coming in from abroad, but the prospects is for still further reductions in shipments. Not only have strikes affected the mining operations in Spain, but the railroad freight situation and the difficulty in making shipments have seriously handicapped the trade.

Ain't Nature Wonderful!

Stone Mountain Prompts a Contributor to Ecstacy and Emotion

Nature was in one of her whimsical moods. She had just finished making the Appalachian Mountains and it had been a right exacting task. Her pattern she had laid out in a long, graceful crescent. She had aligned its points in a semblance of orderly fashion, so that it would look well on a map. She had smoothed the rolly approaches and pointed up the peaks. But she had left in the detail just enough of ruggedness and picturesqueness and artistic variety to edify the exclaiming tourists of later eons.

She had broken the chain here and there into links, so that its segments might be separately named in the geography books; and yet she had preserved the continuity of her ensembled work.

Nature knew she had done a good job. And, as she relaxed with pardonable satisfaction in the good job well done, the pendulum of her temperament swung from grave to gay. She smiled, slyly.

From the Appalachian creation there had been left over a dab of material. To a mere man, had be been privileged to be a spectator at these tremendous events, this left-over would have sized up as a quite considerable dab. In the lump, as it lay, it was some seven or eight miles around and a half-mile or so high. It was solid granite, or what would be granite after it had had time to season for a few ages.

Nature chuckled—if so musical a thing could have been called a chuckle—and searched her modelling board for a place to put that dab of material. Pure feminine perversity, nothing else, guided her choice. There was no logic about it; no rhyme or reason. It was, well just—because.

The spot she picked was in the midst of a level plain, down almost to the center of what those geography books were later to call the state of Georgia. It was miles and miles from any mountains, or any semblance of them. There, in that incongruous place, Nature placed her dab of material. She sloped it off a bit on one side, to connect rather jerkily with the adjacent topography, and left the other side just as it was, sheer and steep and bare as the forehead of some bald giant.

Some millions of years passed, and then one day Fernando de Soto sailed westward from Spain for some reason—maybe to find a place where rents were cheaper. He landed in Florida, checked up four or five of the original and authentic Fountains of Youth as previously located by his ambitious countryman, Ponce de Leon, didn't like the water supply from any of them, and, accompanied—history says—by 600 of his men and 200 horses, moved up to spend the winter with the Chickasaws in Georgia. The Chickasaws were hospitable to unexpected company. They must have been.

De Soto spent not only that winter, but a couple of winters, with the Chickasaws. And one spring day, while he was out for a stroll with two or three hundred of his men and his circus of horses, he collided with the gargantuan gob of granite that Nature had left.

"An excellent place to build a fort," De Soto remarked to eighty or ninety of his companions. And straightway they climbed the thing—from the sloping side; it can't be done from the other side—and proceeded to build them a fort.

Now the strategic purpose that the fort was expected to fulfill is not now apparent. De Soto didn't need it against the Chickasaws. They seem to have demonstrated their friendliness. Maybe building forts was just a Spanish habit.

Anyway, De Soto built him a high-class fort about the top of the mount. Its encircling walls were made up of great pieces of granite; and its single entry and exit was so fashioned that a man could pass through only on all fours—and he couldn't be a very large man, either. As a military stronghold, that fort could scarcely have been improved upon. Its academic excellence was in no way depreciated by the fact that, since there was no one to fight, it was almost useless.

However, history fails to show that De Soto made any use of his lofty fort, aside from going out once in awhile with a couple brigades of his men and looking at it. And, after he had vacated the premises and sailed back to Spain to vote, or something, the mountain worried along for three hundred years or so without anybody doing

Stone Mountain, De Kalk County, Ga.

anything to it. True, it was officially named Stone Mountain, and a great railroad system laid its route past the foot of it and advertised it as a scenic marvel—which it is—and tourists trolleyed out the sixteen miles from Atlanta to look at it and buy its postcard pictures and wonder why it had been put so far from the city. But no one thought of using the mountain in any other way.

Agriculturally, the mountain had its drawbacks. Along about the time of the Civil War, some imaginative individual bought it for eight cents an acre—or maybe it was at the rate of three acres for a quarter. But when he found he couldn't raise cotton on it and couldn't have got the cotton down if he could have raised it, he sold the thing in disgust—for forty cents an acre to some equally imaginative, but less experienced purchaser.

And so it went until about thirty or forty years ago when some bright intellect suddenly conceived the notion that with so much excellent building material lying around loose-like, it might be a good idea to apply it to the purposes of building. And he started a quarry. Others followed.

Quarrying operations have been going on at Stone Mountain for these three or four decades; and they haven't so much as dented the bulk of the granite. Some inquiring civil engineer, with a keen transit-eye, a liking for figures and the physical tenacity of a mountain goat, has estimated recently that there is in Stone Mountain, in exposed, good-quality granite, a total of 7,543,750,950 cubic feet. Very likely he is about right. His estimate, on the basis of a less scientific but scarcely less interesting personal survey that consisted of climbing laboriously over about one-half the mountain and refraining conscientiously from falling off the other half, is hereby endorsed. If it varies either way from the truth, it possibly is several million cubic feet short.

Stone Mountain, itself, is now controlled and is being quarried by the firm of Venable Brothers, of Atlanta. On the mountain proper, quarrying operations are a sort of combination of Alpine mountaineering and tight-wire acrobatics. In fact, one of the instruments that is used is a thing that was named for that steady-gaited, high-altitude pedestrian who crossed

White 5-ton truck in quarry of Davidson Granite Co. on granite ledge of Stone Mountain, Lithonia, Ga.

Niagara a couple of times without using a bridge or an aeroplane—Blondin. A Blondin, in Stone Mountain quarry language, is a stoutly anchored, steel cable on which, with an arrangement of pulleys, blocks of granite coast precariously down from where they are split loose upon the side of the mountain, to the cutting sheds and the railroad line, where they are shaped and shipped. It's right thrilling.

But the deposit of granite of which the mountain is a part extends out on the level, just beneath the surface soil, for a considerable distance in all directions. And thereby it permits of quarrying work of a more nearly normal sort—operations in which it isn't necessary for the quarrymen to climb to work in the morning and slide home at night, and in which the transportation of the product becomes a horizontal, rather than a perpendicular, proposition.

At Lithonia, near the mountain and on the same "vein" of rock, is the quarry of the Davidson Granite Company, owned and operated by J. K. Davidson, Sr., and his three sons: J. K., Jr., who is the vice-president and assistant general manager; N. A. Davidson, who is the secretary-treasurer; and Charles L. Davidson, who is the superintendent.

Granite from the Davidson quarry, either in the form of building stone, curbing, paving blocks or crushed for concrete mixing and roofing purposes, is shipped all over the United States. The output, in the various forms, runs from 1,000 to 1,500 cars annually.

At the Davidson properties the granite is being taken out of a knoll of rising ground, where it crops out close to the surface—and is transported to the cutting sheds and the crusher, which are located on a spur track of the Georgia railroad.

A motor truck, a White 5-ton unit with double-reduction gear drive, does the transportation work. For convenience in loading and unloading, the truck has been equipped with a platform body, on which are placed removal boxes (called "boats"), each box being fitted with iron rings to which the chains of a derrick hoist can easily be attached.

Much of the truck's work consists of carrying rubble. Rubble is stone—in this case granite—in irregular shapes. At the Davidson quarry, as at others, of course, the rubble is the material from which the crushed stone is made. It is quarried for that purpose and is in no sense a waste product. In operation, as the rubble is quarried and split, it is loaded directly into the removable boxes on the truck and hauled to the crusher, where the boxes are lifted by a derrick and dumped. In the hauling of larger stone, building blocks up to three or four or five tons and curbing, the boxes need not be used and the material is loaded directly upon the platform bed of the truck body.

"Our motor truck is replacing six teams of horses," said Assistant General Manager Davidson. "It hauls an awful heap of stuff in a day. But even at the rate we are taking it out, I think it will be a long time before we exhaust our supply of granite."

Mr. Davidson, you see, is a true conservative. A. H. L.

News from Canada

Activity in Building Permits and the Material Market

CONSIDERABLE building work is now being carried on in Canada, most of the activity being in industrial plants in the cities. Some work is being done on apartment houses, theatres, garages, etc., but few stores and dwellings are being erected. During the month of April building permits issued in the 55 cities of the Dominion totaled $16,382,543, almost double the figure of $8,258,150 for March, and more than double the figure of $7,059,641 for April last year. These figures do not include road work or other engineering undertakings. Winnipeg shows the largest increase, as that city is rapidly recovering from the general strike which took place a year ago.

While some extensions are being made by the Canadian Pacific and the Canadian National Railways, they are proceeding cautiously in view of the high costs of labor and material. The same conditions have prevented the governments and municipalities from planning extensive programs of public works. The new farmer-labor govenment in Ontario is anxious to improve the roads in the province, and has announced that several million dollars per year will be spent in this way, but it is not anticipated that very much will be done just at present.

A shortage of building materials is reported from the west, where it is estimated that about $85,000,000 will be spent during 1920 on the erection of houses, schools, public buildings, etc. Building supplies are also below the demand in Ontario, especially in the case of brick. The entire output in the province will be required locally, and numerous inquiries received from the United States cannot be attended to. Shortage of coal is one of the present difficulties of the brick manufacturers.

Builders and contractors in the western Ontario peninsula are complaining of the action of the American companies in using gravel from the St. Clair river, and Kent county council passed a resolution on June 12 to petition the government to prevent these operations. Companies obtaining sand near Pelee, Essex county, have also been forbidden to continue operations until permission has been obtained from the Ontario government. The erection of a creosoting plant is proposed by the Canada Creosoting Company, of Toronto, and tenders have already been called for the work.

A cement plant in Durham, Ont., formerly the property of the John E. Russell Company, Toronto, has been taken over by a stone crushing industry, which proposes to supply materials for road building.

The C. P. R. recently opened a new rock-cut near Bedell, Ont., to obtain a supply of stone for use on its double track line from Montreal to Smith's Falls, Ont.

A brick making plant is to be started at Matheson, in northern Ontario, by the Matheson Products Company, with an immediate capacity of 20,000 bricks per day, which may later be increased to 100,000 per day. One hundred and ninety acres of land, with a clay deposit about 40 feet deep, will be utilized. Tile and terra cotta ware, as well as brick, will be manufactured.

The new sand and gravel plant of the Springer Transfer Company, at Mountain Road, near Albuquerque, N. Mex., one of the largest in the state, is now in operation, and is prepared to produce sand and gravel in very large quantities. The bins have a capacity of 1,000,000 pounds of gravel. The power plant consists of two 20-horsepower electric motors, and the average gondola can be filled in five minutes. The company ships to all parts of its own state, as well as to Kansas and Oklahoma.

Springing Deep Well Holes in Blasting

By DANIEL J. HAUER

IN drilling deep holes for blasting with well drills, and working a ledge in one lift, it is possible, when the drilling is done in an efficient manner, especially when the holes are sprung, that the high ledge be generally broken on a decided slope. If holes are not sprung well, the resulting blast is likely to leave a straight up wall, as in Fig. 1.

This straight wall is an advantage as far as new drilling is concerned, as it is possible to set the drill up on top of the ledge at the required distance back from the face and drill new holes and shoot them without other drilling, thus keeping the face regular, unless the rock is very seamy. This shooting of unsprung holes, which is followed in a large number of quarries, seemingly saves drilling, yet it increases the cost of drilling per cubic yard or ton, over firing sprung holes. Also the cost of balsting is increased over sprung holes.

When deep well holes are properly sprung and then shot, the breaking of the ledge is likely to be along the lines shown in Fig. 2. With ledges from 50 to 100 feet or more high, the breaking back from the drill hole is likely to be from 20 to 40 feet or more at the top of the ledge. This means to add from 10 to 40 per cent to the volume of rock loosened by the blast.

With such results it means that for each lineal foot of hole drilled, a greater yardage of rock is loosened, and also that each pound of powder used is more effective, not only throwing down more cubic yards, but breaking the rock up into smaller pieces. Actual cost records used for comparisons of these two methods of blasting show the results as indicated.

With sprung blast holes and the breakage as shown in Fig. 2, it is necessary to breast up the ledge before another large shot is made. This does not mean to make the ledge straight up and down as shown in Fig. 1, but it is necessary to turn up the toe of the slope for at least half the height of the ledge, as illustrated in Fig. 3.

The difficulty of breasting the ledge after blasting is one reason that many quarrymen use unsprung holes. The cost, seemingly large, is amply repaid in efficiency of the blasts and the actual saving in both drilling and explosives. The steep slopes left seldom permit of a drill being set upon them, unless scaffolds are built to hold the drills. Some quarrymen do this, and even then save money. They build a scaffold at the top of the ledge to run a well drill far enough out to make the breast almost straight up and down, springing these holes, but not as much as when the larger blasts are made.

Scaffolds are also made to hold tripod drills on the slope and thus sink holes 18 to 20 feet deep. In other cases ladders and light scaffolds are used to hold men with hammer drills and bring the breast down by successive blasts, drilling holes 10 or 12 feet deep.

Without scaffolds, snake holes can be drilled into the toe of the slope at

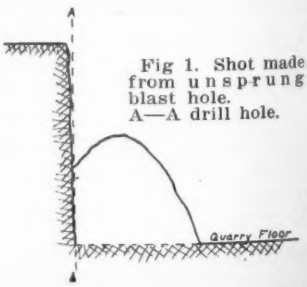

Fig 1. Shot made from unsprung blast hole. A—A drill hole.

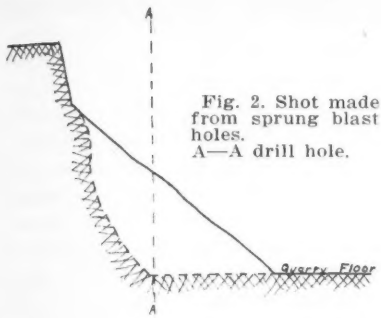

Fig. 2. Shot made from sprung blast holes. A—A drill hole.

the quarry floor. For shallow holes, hammer drills can be used, but for deeper holes a tripod drill is more effective.

With the ledge breasted up it can be seen that the large drill holes on the top of the ledge can be spaced much farther apart, the distance between lines of holes being from a quarter to a third greater, while the holes in a line can be at least a fifth of the distance farther apart. This

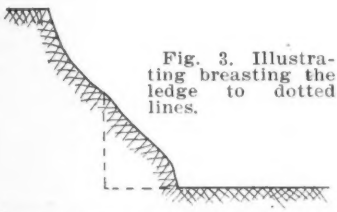

Fig. 3. Illustrating breasting the ledge to dotted lines.

will more than offset the drilling made necessary by breasting the ledge.

If blasting is done along these lines when well drills are used in quarries the cost of loosening and breaking rock will be greatly reduced.

Evidence of the rapid growth of the business of the Atlas Sand, Gravel & Stone Company, Unionville, Conn., is furnished by the installation to take place shortly of a new type of plant equipment, consisting of a large Marion steam shovel on caterpillar traction. Three years ago the K. B. Noble Company who are in charge of the installation, installed the first equipment, consisting of a large dragline elevator, with 100 H. P. motor and bucket.

Cement in Gondolas

Expedient Used to Facilitate Delivery During Car Shortage

ONE of the newest angles of the building material situation in New York is the fact that some of the cement is being sent from the mill in gondola cars over which a tarpaulin structure is built. The dealer is obliged to assume responsibility to the extent of $100 for this structure.

When the car arrives at destination the consignee has to take down the structure of tarpaulin and return it to the company supplying this covering, whereupon a rebate of $90 is given to the dealer if the tarpaulin is not damaged.

This represents approximately 5 cents a barrel more on the cement contained in the car.

The Constant Sand & Gravel Co., Ltd., of Baton Rouge, La., has effected an amalgamation of its company with the interests of the Amite River Sand & Gravel Co., located near Denham Springs, Livingston Parish, La., and also the gravel interests, rights-of-way, lands and holdings in Livingston and surrounding territory, which are owned by Frank T. Constant, of Alexandria, La. Mr. Constant is president and general manager of the Constant Sand & Gravel Co., Ltd., which was recently organized with a capital stock of $125,000. Orders for machinery are being placed at once, and it is expected to have the plant in working order about August 1. When completed, these improvements will add greatly increased facilities. The men in charge will be Mr. Constant, well-known contractor of Alexandria, La.; .T. T. Harrison of Addis, and C. O. Watts, of Bunkie, both the latter connected with the Texas & Pacific Railroad; also George J. Bailey, mechanical and civil engineer, all men of practical experience in the new line of business.

Placing Men at Quarry Work

"A MAN'S a man for all that," is an old saying. Yet men differ much in their make-up and temperament, so much so that a man placed at one job may be a failure, while at some other work he may be such a success as to help to pay large dividends. This is as true with the humblest laborer as it is with a foreman or superintendent.

In the days when men were plentiful and wages were low it was an easy matter to select men. The general method followed, namely, that of hiring and discharging men, until a satisfactory one was obtained, answered the purpose; but at some cost of training them. Today this method is found to be more expensive, as men must still be trained, and many times a quarry would be so short handed as to either curtail the output or cause the plant to shut down. In some sections of the country men are so scarce that it is seldom possible to discharge one when he merits it, and operators are frequently compelled to put up with very incompetent help.

For these reasons the selecting of men for different kinds of work, or rather placing men at jobs for which they may be especially fitted, is most important, and quarry and pit operators should make a study of their men and likewise of the various kinds of work, so as to place the men at the jobs where the best results will be obtained.

To illustrate by an actual example: A few weeks ago the writer stood watching and timing some men working in a small quarry. One man was feeding a small jaw crusher. Why he had been selected for the job the writer was not advised. The stone when it was brought from the quarry was dumped upon the feeding platform. The larger stone was picked up by the men and tossed into the crusher. The fine stuff was either fed to the crusher with a fork or shovel. The man was industrious and kept steadily at work, yet one man loading vehicles to carry stone to the crusher was just as industrious, and was so much quicker in his actions that he picked up from the ground and loaded into the vehicle three stones while the man at the crusher was handling but two. In 10 minutes' time the man loading, handled stone at the rate of about 70 additional pieces over the man at the crusher. Inasmuch as the loader had to raise up his load to place it in the vehicle, while the crusher man only dropped his stone, it can be seen that the man at the crusher should have handled more stone than the one loading vehicles.

It must not be understood that the writer wishes to convey the impression that the loader handled more stone in a given time than the man feeding the crusher, for the latter most of the time used a fork or shovel to feed the crusher, picking up boulders with his hands less than half the time; but when both men used their hands for picking up pieces the loader showed how much quicker in action he was. After timing the work for some little time it was estimated that if these men had changed places, the output of the crusher, if fed by the quicker moving man, would have been increased at least 20 per cent, meaning a handsome extra dividend earned. Thus the change of one man in a crew of ten would have meant much to this quarry operator, while a further study of the rest of the crew might have shown other advantageous changes in placing the men.

One big item in employing new men is the training of them to the various kinds of work. There is a knack to most work and men must be taught this knack, or how to handle certain

tools and at times how to handle their own bodies. Swinging a hammer is done in a number of different ways—one for driving steel and an entirely different way for sledging a boulder.

In selecting men for training for different work, one's judgment cannot be infallible, yet there are many things regarding a man's build and physical characteristics that can be an aid, besides his mental caliber and the experience he has had in similar work.

To one experienced in such matters it was not difficult to see why the loader above referred to, was able to handle more stone than the man feeding the crusher. This man was tall and lanky with arms rather short for his height and quite awkward in his motions. The loader, on the other hand, was short in build, with arms rather long and although stockily built yet quite active. Thus such a man would find it easier work to bend over and pick up stone than the much taller man. The length of his arms as compared to his height would also be a help while his quick motions would be a further advantage. The tall man might have loaded high vehicles well, or been trained to sledge rock.

There are always exceptions to every rule, but generally speaking, men employed for sledging should be tall and heavily built. They are able to give greater force to their hammers, due to the larger swing and descent, as well as to their greater strength.

Short men, especially with long arms are the kind to select to pick things up from the ground. Many of them make good shovelers.

Broad shouldered men with well developed arms and backs are the ones to use on bars, although a man using a bar to pry out boulders from a ledge or a large blast must understand the principle of levers and have some judgment. Only men with good nerves, quick physically and mentally, should be used on the face of the ledge. Too many accidents in quarries are due to the misuse of men. Any man placed at hazardous work should be selected according to his mental and physical alertness.

For hammer drill work, men with strong arms and legs, with stolid nerves and slow in thinking, should be selected. Such men can hold a drill to its work and will not be easily tired by the monotony of their task. An active thinker and a man who tires easily is apt to drill too shallow a hole or have his attention readily attracted from his drill, which means slow drilling and poor holes.

For work that calls for much endurance the type of man to select is one with a well developed chest, slight or small waist line and broad hips, the build similar to a woman. Such men can generally be depended upon. The height has little to do with endurance.

Quick tempered men seldom make good machine runners. Men with patience do. The build of a man has little to do with this. It is a man's general knowledge, mental alertness, interest in machinery and his patience that means successful operation, provided he is physically fit. Some are small and some are large.

Riggers must be the same type of men as machine runners except that they must be entirely fearless for they must climb and run great risks.

From these few remarks it can be seen that there is much in placing men at quarry work. The successful study of men and the careful training and placing of them can mean the increasing of the output of the plant, the reduction of costs and the earning of extra dividends.

Change of address is announced by the Ingersoll-Rand Company of Illinois and A. S. Cameron Steam Pump Works, Chicago Branch. They have removed their offices to 709 Fisher Building, Chicago.

Among Eastern Producers

Prices Moving Up in New York —Considerable Demand for Road Work

WHILE the freight situation in and about New York has shown gradual improvement during the past month, condition are not by any means what they should be, and the result is that the sand and gravel, as well as crushed stone markets are feeling the effects. The call for the materials has lessened considerably, particularly for general building operations, and with the curtailment now going on in the matter of construction work, the prospects are not as bright as they were a few months ago for heavy sales.

At the same time road work is coming forward at a good status, and the producers are more than likely to be kept busy with the demand for sand, gravel and crushed stone for operations of this character. The northern section of the state is commencing to show particular activity in this respect, with concrete and macadam the popular types of highways.

Despite a lowering of demand for gravel, prices are moving upwards, as prophesied in the last issue of PIT AND QUARRY. Gravel is trying to exceed the $2.50 cubic yard level in cargo lots, covering both ¾-inch and 1½-inch material, and the figure which is now prevailing is $3.00; another advance at an early date would not be surprising, and the dealers look for it. In the matter of "on the job" quotations, dealers are asking $4.50 for good washed material. While sand continues to hold at $1.50 per cubic yard in cargo or carload lots, an increase is expected, and it is likely to come in July; dealers are not quoting on the material only on order, and prices delivered are "off"; the figure is close to $2.75 at the present time. Fine white sand is now $5.00 a cubic yard, delivered, with no immediate change in sight. Crushed stone while still holding at present levels is more than "firm" and an early advance is anticipated; ¾-inch material is selling in wholesale lots at $2.15 a cubic yard, while 1½-inch stock is bringing $2.00. Dealers are asking from $3.50 to $4.00 for the material, delivered on the job.

Portland cement has taken another rise, and is now quoted at $4.80 a barrel, as against $4.50 a week ago. Hydrated finishing lime is being turned at $32.00 in cloth, having recently advanced $2.00; in paper, $28.00 is asked.

Solomon Goldstein, 171 Suffolk street, New York, operating a monument works, is planning for the erection of a new plant on property adjoining his present location, 47x100 feet.

The St. George Granite Co., a Maine corporation, has filed authorization to operate in New York, with capital of $100,000. T. J. Blake, 90 West street, is representative.

A quarrying business will be conducted in the Bronx section of New York by the William H. Penney Co., recently organized with a capital of $20,000. J. R. Clary, M. J. and William H. Penny, Jr., 474 West One Hundred and Thirty-eighth street, head the company.

The F. R. Hajek Marble & Slate Co., Long Island City, N. Y., has been incorporated with a capital of $10,000 to operate a local plant. The company is headed by F. R. Hajek, and E. and J. Rysanek.

The Clark & Flannagan Slate Co., Fair Haven, Vt., is planning to open a new slate quarry about two miles from this city. Considerable equipment will be installed for operation, including quarrying machinery, compressors, pumps, hoisting apparatus, etc. The majority of the equipment will be electrically operated.

The call for crushed stone for road work in New Jersey is keeping the producers busy in this section, while county institutions are also devoting efforts to increase the output in this line. Considerable road construction has been held up during the past few weeks, due to freight conditions. The Board of Freeholders at Newark, N. J., has adopted a road program for Essex county, calling for an expenditure of $1,145,713, and large quantities of stone and kindred materials will be required for this work. County Engineer Reimer will supervise the construction.

The Ogdensburg Limestone Products Co., Ogdensburg, N. J., has been organized with a capital of $50,000 to operate a plant in this district. T. G. Straker and William A. Kerr head the company.

The Interstate Crushed Stone Co., Shunpike Road, Springfield Township, near Millburn, N. J., is maintaining active operations at its local quarry. The Company is furnishing material for a number of important operations.

The Lafayette Slate Quarry, Inc., Newton, N. J., has been incorporated with a capital of $100,000 to operate a plant near the city. Louis Wilkovitz heads the company.

At a recent meeting of the Board of Freeholders, Trenton, N. J., approval was given to a proposition to purchase a steam shovel for use at the county quarries at Moore's Station. Convict labor has been employed at this point, but with need for increased production, the mechanical installation in this as well as other departments is necessary. Freeholder Elmer E. Margerum will be in charge.

The Edison Portland Cement Co. is maintaining active operations at its quarries at Oxford, N. J., and large quantities of high-grade limestone are being shipped.

The freight situation has improved materially in the Lehigh Valley cement district, covering both incoming and outgoing movement. The local mills have been receiving a good supply of coal, insuring continuous operation for some weeks to come. Cars received for the shipment of cement are being handled with utmost dispatch owing to the heavy call for this material, with prevailing market shortage in different sections of the country.

The Limestone Commercial Co., Adrian, Pa., has been formed with a capital of $25,000 to operate quarries in this section. D. D. Bouch is treasurer of the company.

The two-story crusher building of the Union Stone Co., Saginaw (York county), Pa., was destroyed by fire on June 2, with loss estimated at $30,000, fully covered by insurance. The loss included crusher machinery, engine, boiler and auxiliary operating equipment.

There is considerable activity in the industry in the Pittsburgh, Pa., district, and the large producers are being kept very busy. The season is now fully under way, and it is expected that large production will be evidenced during the coming months. The Rodgers Sand Co. has secured the contract for dredging at Cheswick, Pa., for the new plant of the West Penn Power Co., to be located in this section; about 50,000 cubic yards of material will be dredged in the Allegheny River at this point. The Iron City Sand Co. is completing extensive improvements to its gas towboat, "Norfolk," and the vessel will soon be placed in service; it will be known as the "Resq" in the future. The work is being handled at the company's landing, South Twenty-second street. A.

The Federal Sand & Gravel Co., Baltimore, Md., has been incorporated with a capital of $100,000 to operate properties in this section. John T. Walley, Gustav J. Kordula and Marcel A. Palle are the incorporators.

May Release Contractors

Indiana Court Rules New Law Constitutional—Other Hoosier News

ONE of the most important court decisions affecting sand and gravel interests and also the crushed stone trade was that handed down June 8 by Judge Miller of the Johnson County Circuit at Franklin, Ind., when he ruled that the law enacted by the last legislature, providing for the release of road and bridge contractors from their contracts with the county where it is shown that the work would be done at a loss under the contract price because of increased cost of materials and labor, is constitutional.

The court passed on the validity of the statute in overruling a demurrer filed by the Shelby county board of commissioners, to a complaint brought by Charles E. Redding, of Greensburg, Ind., a road contractor, against the Shelby county commissioners, in which Redding sought release from two contracts to build roads in Shelby county.

The county commissioners decided that the law is unconstitutional. The case was appealed to the Shelby circuit court from the county commissioners' court, after the commissioners had refused to release Redding from the contracts, and later was sent to Johnson county on a change of venue. It is the general belief that the ruling of the court will stimulate the bidding of road contractors on such bids as are published. It is nothing unusual now, and the same situation has been true all during the present season, for only one or two contractors to bid on a given piece of work; and in many instances the bids were so high because of the uncertainty of the market and the natural desire of the contractor to protect himself, that the commissioners threw out the project.

Although much has been published during the past month to the effect that the car situation is being cleared, little improvement has been noticed by sand and gravel men throughout Indiana and recent orders issued to railroads favoring the coal trade offer but little encouragement for the future. It is true that in some parts of Indiana the car shortage has been less noticeable, but in the main the shortage still prevails with the same "shortness" as ever.

Crushed stone being handled by J. W. Blackman, of Indianapolis, went considerably "higher" recently when a truck he owns and drives and which was loaded with crushed stone for road work, caught fire and twenty-five gallons of gasoline exploded blowing truck, stone and debris high into the air. Blackman escaped when he found he could not extinguish the blaze which started at the large capacity gasoline tank.

A wage controversy between stone operators and stone cutters, diamond sawyers and planermen of Bedford, Ind., who went on strike April 6 was settled at a general meeting May 27 and the mills resumed operations immediately. It is understood that the cutters will receive $1 an hour; planermen, 80 cents and sawyers, 60 cents, with back pay to date from February 1 until the time they went on strike. Although work was resumed in May it was not until June 4 that shipping was resumed. On that date two train loads of thirty-seven cars each were shipped to New York.

The trade received a jolt June 9 when announcement was made that at a meeting of the county commissioners of Hamilton county, just north of Indianapolis, it was decided that twenty new roads that have been going through various preliminaries with a view of reaching the point where the contracts for their construction might be awarded, were car-

ried over indefinitely. The board declared it to be their belief that material and labor would be lower in a year and that there would also be a market for the bonds.

The Banner Rock and Products Company, of Alexandria, Ind., which for a time was in a precarious condition because of lack of coal for operation purposes were relieved of their worries recently by a consignment of coal.

A certificate of preliminary dissolution has been filed with the secretary of state by the Centliver Sand and Gravel Company, of Fort Wayne, Ind.

Porter Is Victim of Motor Truck

Prominent Michigan Sand and Gravel Producer in Fatal Accident

JOHN STILLMAN PORTER, vice-president and general manager of the Federal Sand & Gravel Company, Saginaw, Mich., former city assessor and prominent in state business and political circles, died at St. Mary's hospital, Tuesday afternoon, May 25, of a fracture of the skull and concussion of the brain, sustained the previous day when he was run down by a produce truck.

John Stillman Porter was born in Buckland, Mass., June 6, 1856, and received his education there, also spending two years in Europe in travel and study. Although not a registered student there, he attended several lectures at Heidelberg university in Germany. He came to Saginaw in 1875, and for ten years was in the employ of the old Flint & Pere Marquette railroad in the maintenance of way department. In 1889 he went into the lumber business, being the senior member of the Porter-Morse Cedar Company. He was treasurer of the F. W. Wheeler Shipbuilding Company of Bay City the last two years of the existence of that firm, before it was sold to the American Shipbuilding Company, and was for a number of years interested in the Loveland-Stone Lumber & Salt Co.

J. S. Porter

On January 1, 1905, he was appointed city assessor, serving in this capacity for four years. At the time of his appointment, he was also state salt inspector, having been appointed by the late Gov. Bliss. After leaving the assessor's office he spent three or four years at Thessalon, Ont., as manager of the Loveland-Stone lumber interests there, and after that went to Florida, also engaged in the lumbering business. He returned to Saginaw about four years ago and became interested in the Huron Shore Gravel Co., which was recently reorganized under the name of the Federal Sand & Gravel Co. At the time of his death he was also a director of the National Gravel Producers' Association.

Busy Muscatine, Iowa, is living up to its reputation. Its latest acquisition is the $500,000 corporation, the Hahn Muscatine Company, which is planning to erect a new gravel plant, the contract for the pumping and screening plant having recently been let and work will begin at once. The land which will be worked consists of 80 acres, which the company either owns or on which it has acquired options.

The West Line Rock Co., Wilmington, Del., have incorporated recently, and will engage in the business of rock quarrying. The authorized capital stock is $150,000.

Expecting to Fill All Orders

Texas Towns See Some Improvement in Railroad Situation

SHORTAGE in railroad transportation is the outstanding feature of the gravel business in Texas just now. Financial restrictions placed by the Federal Reserve Bank and other financial institutions as a means of reducing non-essential loans have had a tendency to curtail building, but so far, this curtailment has not been felt in the gravel market, especially about Dallas and Fort Worth.

The J. Fred Smith Gravel Company of Dallas, one of the largest shippers of gravel and sand in North Texas, reports that its business is now and has been for some time measured only by the number of railroad cars it could get to transport its product. This company, which operates extensive pits near Dallas, in which loading is done by steam shovels and drag lines direct from pit to railroad car, handles all its shipments by rail. No automobile trucks or wagons are maintained, and the company has been particularly hard hit by the railroad situation. Orders are booked far ahead and no definite promises of any kind are being made regarding deliveries. These are sometimes made in one week, but more often three or four weeks are required.

Other companies about Dallas and Fort Worth that handle their product by rail are in a similar position as regards deliveries. All report many orders on hand and little prospect for early deliveries. Most of the other companies, however, maintain a fleet of automobile trucks or wagons and delivery of gravel for use in Dallas or on roads not far away is being made regardless of the railroad situation. The recent excessive rainfall, however, has left roads in bad condition, and this has a tendency to deter deliveries. It is only comparatively recent that deliveries by motor truck could be made at all over the country roads.

In Dallas and Fort Worth now much building is under way and the consumption of gravel is very heavy. Much of this gravel is being delivered by motor truck from pit to the job, as pits are usually near town, or on a hard-surfaced road that can be traveled regardless of wet weather.

The price of gravel in this section varies considerably with different companies. There is no standard price, each company setting its own figure. Most companies have advanced their prices as the prices of labor and of other commodities have advanced, but some have made deliveries at a figure but little higher than the old level.

While gravel prices have not declined materially, due in part at least to the demand growing out of the car shortage, a weaker tone is becoming manifest just now.

The J. Fred Smith Gravel Company quotes pit run gravel at $1.50 per cubic yard f. o. b. cars at the pit. Gravel delivered by motor truck on the job is quoted from $2.50 to $3.50 per cubic yard. Screened gravel and sand are higher.

Shortage of cement, crushed stone and other road building materials is slowing up highway construction and street paving in this section, and with this slowing up there is a falling off in the demand for gravel. This weakening of the demand, however, is not sufficient as yet to affect the market to a material degree. The inability to get railroad cars in which to make deliveries has just about offset this slowing up movement.

A slight improvement in the railroad situation within the last week or ten days is reported, and further improvement is expected soon. With

this improvement, it is expected that gravel companies will be able to fill all orders now on their books, and when that condition is reached, there will undoubtedly be a break in the gravel market. No sensational drop in price is expected, as it is claimed by some companies that they are handling gravel on a close margin now, and that wages and other costs of operation must come down before they will be able to reduce prices. K.

Credit on Freight Charges

New Ruling of Interstate Commerce Commission Now in Effect

ON June 4 the Interstate Commerce Commission handed down an order in Ex Parte No. 73, the case involving payment of freight charges and the extension of credit accommodation to shippers. Hearing was granted by the Commission on April 21. The order, which is as follows, provides a credit period of 96 hours:

It is ordered, That the following rules and regulations be, and they are hereby prescribed to become effective on July 1, 1920, and to remain in force until the further order of the Commission:

1. Where retention of possession of any freight by the carrier until the tariff rates and charges thereon have been paid will retard prompt delivery or will retard prompt release of equipment or station facilities, the carrier, upon taking precautions deemed by it to be sufficient to insure payment of the tariff charges within the period of credit herein specified, may relinquish possession of the freight in advance of payment of the tariff charges thereon and may extend credit in the amount of such charges to those who undertake to pay such charges, such persons being herein called shippers, for a period of ninety-six hours to be computed as follows:

(A) Where the freight bill is presented to the shipper prior to, or at the time of, delivery of the freight the ninety-six hours of credit shall run from the first 4:00 p. m., following the delivery of the freight.

(B) Where the freight bill is presented to the shipper subsequent to the time the freight is delivered the ninety-six hours of credit shall run from the first 4:00 p. m., following the presentation of the freight bill.

2. Every such carrier shall present freight bills to shippers not later than the first 4 p. m. following delivery of the freight, except that when information sufficient to enable the carrier to compute the tariff charges is not then available to the carrier at the delivery point, the freight bills shall be presented not later than the first 4 p. m. following the day upon which sufficient information becomes available to the delivering agent of the carrier.

3. Shippers may elect to have their bills presented by means of the United States mails, and when the mail service is so used the time of mailings by the carrier shall be deemed to be the time of presentation of the bills. In case of dispute as to the time of mailing the postmark shall be accepted as showing such time.

4. Sundays and legal holidays, other than Saturday half holidays, may be excluded from the computation of the period of credit.

5. The mailing by the shipper of valid checks, drafts, or money orders which are satisfactory to the carrier in payment of the tariff charges, within the period of credit prescribed above, may be deemed to be payment of the tariff charges within the period of ninety-six hours of credit. In case of dispute as to the time of mailing the postmark shall be accepted as showing such time.

As one of the consequences of the prevalent car shortage, it has been found necessary to close down indefinitely Mill No. 2, of the Atlas Portland Cement Company, at Northampton, Pa. As the employees will be given other work on the grounds of the company, it will not be necessary for any of them to suffer a loss of wages. This shutdown is working a considerable hardship on the company, as they have on hand large orders, which they will be unable to fill without means of transportation. The company's daily output is 6,000 barrels of cement.

With the Louisville Trade

Convention of Road Interests Made June a Memorable Month

THE center of wide interest with the trade in Louisville and Kentucky during June was the meeting of the Kentucky Good Roads Association, The Kentucky State Engineers, and All Allied Good Roads Interests, at the armory in Louisville, June 15-16-17.

The meeting included a street parade by the machinery and appliance people as an introductory to the convention proper, and the public introduction of the new State Highway Commission of Kentucky which consists of Ben Weille, Paducah, Ky., H. H. Asher, Pineville, Ky. and H. Green Garrett, Winchester, Ky.

In the big armory at Louisville there was a good showing of machinery, appliances and materials for road construction, and among the exhibitors were the Ohio River Sand Co., and the E. T. Slider Co., who are also prominent in the sand and gravel trade.

The convention was opened by an address by Governor Morrow, of Kentucky, and talks were heard on every phase of road-making from raw material requirements and truck and transportation work to the final finishing off of roads. Particular interest was added to the occasion because under the new laws and highway system plans the state will spend at least two million a year on a net work of roads to connect up the different counties of the state. This is of special interest to stone and sand people because it not only means a quantity of crushed stone but also sand and gravel for concrete work.

The big gathering mixed pleasure with business, there being a motor trip and luncheon at Seningo Park at noon one day, followed by a tour of the roads around Louisville, and the last day of the convention delegates were taken to Fountain Ferry Park for dinner.

In addition to taking time off for an active interest in the gathering of the good roads interests of the State of Kentucky at the Armory June 15-16-17, other matters which have held interest for the stone, sand and gravel people locally is the going into effect of the new housing law which is something of a handicap in building in Louisville, and coincident with it the going into effect of the state law which puts a cent a gallon tax on gasoline, adding this much to the cost of operating gas motors.

The new housing law in Kentucky, which applies only to Louisville, places restrictions on the building of bungalows in that it requires a yard space of 10 feet where there are windows on the side and 4 feet any way. It is argued that this makes impractical the building of bungalows and cottages on narrow lots and its tendency points so strongly toward restricting building operations now that contractors and real estate men are organizing for a legal fight on it.

Meantime, between the going into effect of this new building law and the tightening down of finances there has resulted a slowing down in the local demand for sand and gravel. The operators here in river sand and gravel say that they do not expect building to be very active now until the end of the summer season. On the other hand, while the local building demand is slow, it is not slow times by any means with the local sand and gravel people because they are very busy restocking their depleted yards to meet the needs for the road work in the surrounding territory.

The Ohio River Sand Company, for example, had its big stock yards here practically emptied in the spring and

has been operating night and day shifts right along in order to replenish the supply and be prepared to meet the needs for concrete road building and for concrete work on bridges, culverts, etc., even when the roadbed itself is not concrete.

The E. T. Slider Co., while they have not been operating a double shift on the river, have been working steadily during the day time and are gaining some with their stock in the yard. They have not yet accumulated a large stock, however, because their volume of demand has been taking a fair quantity of their output right along and they find trade fairly good right now, even though building operations have slowed down somewhat.

The R. B. Tyler Stone Co. are operating a crushing plant to as full extent as it is possible to get cars. The main handicap to quarry and crusher work throughout the state as elsewhere throughout the country is shortage of cars and difficulties of transportation. There is plenty of demand for crushed stone and the plans for highway construction indicate lots of future business.

Lime Products That Can Be Sold

LIMESTONE products are becoming more and more used in many trades and pursuits. Many quarrymen do not realize that in only crushing limestone for sale as crushed stone, they are curtailing their sales and profits.

It is hardly possible to name all the uses of limestone, but some of the many can be listed. Crushed limestone possesses special merit for structural concrete, while a limestone of the proper hardness to give a good co-efficient of wear, makes a superior concrete road. Limestone is also used for fluxing in furnaces. For large blast furnaces the stone only has to be well broken up, but for flux stone for crucibles it must be crushed. With increased production of metals from furnaces there is an increased demand for flux stone, and this is an all-the-year business.

When the grade of limestone is such as to allow burning, there are many sales for the lime, but a hydrating plant not only increases the uses, but allows continuous production and permits of the lime being stored without danger of deterioration.

Crushed limestone may be considered a comparatively new product, yet one coming in great demand. For years the dust has been used for carbonating waters and soft drinks, but now it is used for agricultural purposes. So extensive has this use grown that many farmers purchase small pulverizers, when they have limestone on their land, and make their own dust. If in a limited way farmers can produce agricultural limestone, it should be evident with ample plant the cost should be small to a quarry operator, especially if it is made as a by-product.

Another product that can also be produced at the same time is crushed limestone or grit for chicken feed. The sale for this is not always large, yet if it is sacked, it can be sold in either ton lots or by the carload. Limestone not only answers the purpose of grit, but also the lime in it helps in shell making for egg production.

Some limestones make excellent building stone, and some take a fine polish so that they can be used for architectural purposes, their even texture admitting of easy carving.

Rochester, N. Y., is the home of a new sand producing concern, being the newly incorporated Greeley-Donohue Sand Company, whose authorized capital stock is $10,000, the interested parties being P. J. Greeley, E. H. Donahue, J. F. Curry, J. M. Murray and W. J. Hart.

N. C. S. A. Executive Committee Meets

Called in Chicago to Discuss Traffic Situation

THE executive committee of the National Crushed Stone Association met in Chicago June 8, the principal topic of discussion being the matter of car service.

President John Rice stated that the serious condition of the crushed stone industry in the matter of car service and increased rates were of such importance as to demand attention and action of the executive committee.

Secretary Sandles presented a letter from Hon. R. W. Wooley, Interstate Commerce Commissioner, as follows:

June 1, 1920.

Dear Mr. Sandles:

I have referred your letter of May 29th to Colonel F. G. Robbins, Director of our Bureau of Service, for such action as he may find it possible to take. The transportation conditions are terrific, following the return of the railroads to private control, but I sincerely hope that the heroic treatment which this Commission is now applying will soon be productive of beneficial results. Nothing is of greater importance than to continue and to increase the building of good roads.

Very truly yours,

R. W. WOOLEY.

After discussion all agreed that on account of strikes, etc., railroads were doing their best to give service in spite of serious handicaps under which they were compelled to operate. The executive committee agreed railroad managers were more in need of encouragement, patience and helping hand from shippers than they were of criticism. But they showed by reports from various states that quarrymen needed relief and that present conditions were resulting in loss to many stone operators.

With the committee's approval, Mr. Rice addressed the following letter to the Interstate Commerce Commission:

TO INTERSTATE COMMERCE COMMISSION:

We enclose copy of letter to members of National Crushed Stone Association, suggesting patience in their extreme embarrassments by reason of present car shortage.

At same time we trust you will take into consideration the enormous sacrifices the stone industry was compelled to make during the war and as soon as there is opportunity to grant relief you will give our situation your special sympathetic consideration.

Even at the present time the necessity for road building should and doubtless will not be overlooked and especially should every effort be made by railroads to supply cars to their maximum ability where stone loading is in direction of empty car movement to coal mines. Not only in our selfish interest but in interest of national economy, public welfare, and railroad revenue as well.

With the committee's approval President Rice also addressed the following letter to the crushed stone industry:

TO MEMBERS OF THE CRUSHED STONE INDUSTRY:

In view of many earnest appeals from members all over the country to the Association for assistance in securing improvement in car supply, it was deemed advisable to call special meeting of Executive Committee.

This meeting was held in Chicago, June 8, and all data and information bearing on this unfortunate situation was given earnest consideration. The evidence seems to indicate however that conditions are most extraordinary and that every effort is being made by railroad companies, supported by Interstate Commerce Commission, to do their utmost under the circumstances and any organized pressure upon Interstate Commerce Commission only ads to its embarrassment as well as the railroads. It is believed by Executive Committee that at present time best results for all concerned will be obtained by individual shippers presenting their cases to their respective railroads for the best adjustments possible.

It is sincerely regretted your Committee can offer you no specific relief at present time but it will endeavor to keep in touch with the situation and urge the Interstate Commerce Commission to grant relief at the earliest moment possible.

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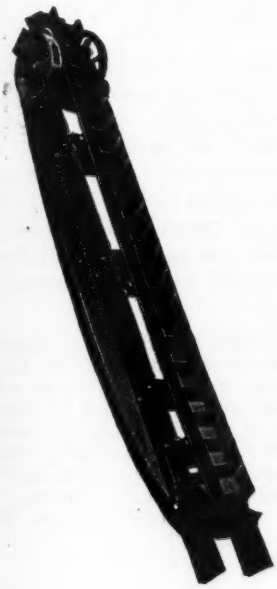
Gravel, Sand and Stone Plants



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GEARS—MACHINE MOLDED or with CUT TEETH.

CHILLED RIM SPROCKETS.

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Pacific Buyers Trying to Protect Themselves—But There are No Serious Delays

EVERYBODY is crying for material on the San Francisco market, especially for sand and gravel. There has been so much talk of car shortage that contractors are afraid they are going to be delayed for want of material deliveries and they are calling for their contracts in advance, if possible, of agreed upon dates. This has caused the sand and gravel men to work at the highest possible speed, and it is stated that for several months past the output has been beyond that of any like period.

As a matter of fact there have been no serious delays in transportation of these materials. During the actual progress of the switchmen's strike there was some delay, but that matter has been remedied. Of course, there is more or less erratic delivery of cars, but taken over a considerable period there is no actual shortage. Frequently when ten or twelve cars are called for, only two or three will materialize on time, but the others called for show up a day or two later and by the month all needed cars are furnished.

The general tightening up of financial conditions has held up the sale of many of the bonds to be issued for the purpose of improving the State highways. This means that the work itself on a considerable portion of these improvements is going to be postponed for some time. This condition affects the territory contiguous to San Francisco less, perhaps, than any other section. The State highways in this section are pretty well completed and most of the road building is being done by the counties. It is said that about 50 per cent of the gravel and sand produced in this section goes into the roads and the balance into building construction.

The Niles Sand, Gravel and Rock Company has been making some improvements in its plant. A trestle has been built over the creek in order to get at a more favorable point of excavation, and the company is planning to put on a double shift to increase its output.

The comprehensive state highway system of Washington is to be greatly improved by the state highway commissioner. According to James Allen, the commissioner, the department has located, prepared the plans and estimates, secured the right of way and let 113 contracts for the construction and improvement of 525 miles of road at a total cost of $10,378,000, not including engineering, and for the construction of twenty-five concrete and steel bridges at a total cost, exclusive of engineering, of $1,701,000. The standard pavement adopted by the Washington state highway department is one course concrete, 1-2-3 mix, 7½ inches at center and 6 inches at the edge, and no pavement built less than 18 feet wide with 4-inch shoulders.

About 200 quarrymen at the plant of the Standard Lime & Stone Co., Martinsburg, W. Va., returned to work on June 16, after being out on strike for five days, with demand for about 20 per cent increase in wages. The men asked for the same pay as now being received for ten hours, for eight hours works. The request was not granted by the company.

The Constant Sand & Gravel Co., Alexandria, La., recently incorporated with a capital of $125,000, has acquired extensive gravel deposits on the Amite River, near Denham Springs, La. The company plans for the immediate development of the property, and will install equipment for this purpose. It is proposed to build a branch railroad track to the site. Frank T. Constant is president and manager; George Bailey is treasurer.

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3 TO 20 TONS **GAUGE, 18"- UP**

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Steam Shovels

Special attention is called to the following thoroughly overhauled shovels.

1—Model 0 Thew, shop number 1084.

2—Marion 60 Steam Shovels with 2½ yard dipper, Shop Nos. 1995 and 2059.

1—Type "B" Erie, ¾-yard, full revolving, on traction wheels.

LOCOMOTIVES

1—10x16-in., 20-ton, standard gauge Baldwin Locomotive.

6—18 ton, 10x16, H. K. Porter Dinkeys, 36" gauge.

CARS

30—12 yard capacity Western, standard gauge air dump cars, 26' beds.

90—20-yard capacity standard gauge Magor air-dump cars. These are new cars, built for U. S. Government, steel construction throughout, with wood floors.

67—12-yard capacity standard gauge Western Wheeled Scraper Company's cars. These are new cars built for U. S. Government, latest type construction.

In addition to the above, we have a large stock of contractors' construction equipment of various classes.

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2—No. 6 Gates gyratory
1—No. 6 Kennedy gyratory
1—No. 5 Kennedy gyratory
1—No. 4 Austin gyratory
2—No. 3 McCully gyratory
1—No. 2 Austin gyratory
1—48x60 Traylor jaw
1—30x60 Traylor jaw
1—15x24 P. & M. jaw
1—13x30 Farrell jaw
1—10x20 Farrell jaw
1—12x22 Acme jaw
2—9x16 Climax jaw
1—9x16 Reliance jaw
1—9x15 Cedar Rapids jaw
1—7x12 Reliance jaw

SCREENS—Assorted Sizing, Scalping and for sand.
ELEVATORS—Assorted lengths, capacity 25 to 250 tons per hour.

Steam Shovels

1—Erie, type "B," ¾ yd. dipper, traction, full revolving.
1—Model 28 Marion, ¾ yd. dipper, 30' crane boom for clam shell bucket operation, traction, full revolving.
1—Bucyrus, 18-B, ⅞ yd. dipper, only used nine months on light work, traction, full revolving.
1—Marion, Model 20, Shop No. 922, 1 cu. yd. dipper on standard gauge railway trucks.
1—Marion, Model 40, Shop No. 1865, 1½ cu. yd. dipper on standard gauge railway trucks.
1—Bucyrus, 70-C, Shop No. 1635, 2½ cu. yd. dipper on standard gauge railway trucks.
1—Boom for Model 60 Marion, 35' long, 24' dipper stick and 1¾ yd. dipper, slightly used.
1—Dipper, 1¼ cu. yd. for Thew Shovel.

Locomotives

1—Baldwin, consolidation, type 2-8-0, 8 drivers 44" centers, 20"x24" cyls., 107,000 lbs. on drivers; 8 wheel tender; 9½" air pump; tractive force 22,000 lbs. Now working, will be released shortly from lease.
1—Pittsburgh, Saddle tank, 4-38" drivers, 14"x24" cyls., steam brakes, standard gauge.
3—Porter, Saddle tank, 4 wheel; 9"x14" cyls., 36" gauge.
1—Vulcan, Saddle tank, 4 wheel; 9"x14" cyls., 36" gauge.
2—Plymouth, 4 wheels, friction drive, 3 ton, 4 cyl. gasoline engines, 36" gauge.

Pumps

1—No. 11 Cameron, Regular Pattern Piston type, No. 21258, cylinders 16"x10½"x18"; 408 gal. per minute; 8" suction, 6" discharge; guaranteed.
1—No. 6 Laidlow-Dunn-Gordon, deep well type, No. 133457, 2"x3"x32"; 3" suction and discharge; with brass suction chamber, sucker and sucker rod connections.
1—No. 3½ Foster, single acting, 6"x4½"x7", 2½" suction and discharge.

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1—1 yd. Orange Peel.....$ 300
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2—1-yd. Concrete at $50 each..... 100
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3—2-yd. Brown Hoist at $500 each. 1,500

BOILERS

1—200 H.P. Scotch Marine 2,000
1— 30 H.P. Upright 200
1— 15 H.P. Upright 100
1— 60 H.P. Upright 800
1— 50 H.P. Upright 700
2— 60 H.P. Erie Economic at $750 each 1,500

CRUSHERS

1—No. 12 Gates Style K manganese fitted nickel steel shaft (almost new) 8,000
1—No. 7½ Austin Gyratory..... 2,500
2—20x24 Blake, each..... 2,000
1—No. 4 Gates Gyratory..... 1,000
1—10x20 Blake 750

COMPRESSORS

1—Rand Imperial Duplex, cap. 1,500 ft. 2,000
1—Ingersoll, 2-stage, air, belt drive, 600 ft. 1,000

DIPPER

1—2½-yd. Bucyrus 500
1—¾-yd. Browning with boom and engine (new) 750

DRILLS

8—Chicago Pneumatic Tool Co. 3¼ in. drills, each..... 100

DERRICKS

1—5-ton Stiff Leg with steel bull wheel 500
1—2-ton Stiff Leg..... 200

ENGINES

1—150 H.P. Atlas Automatic.....$ 750
1—200 H.P. Allis-Chalmers Corliss. 1,250
1— 20 H.P. Erie Center Crank..... 200
1— 70 H.P. Erie Center Crank..... 300
1— 15 H.P. Keystone Reversible... 250
1—Westinghouse 250
1—150 H.P. Stillwell Bierce..... 150

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2—6¼x10 American Hoist and Derrick with boiler at $750 each.... 1,500
2—6x8 Contractors' Plant Co. S. C. S. D., at $200 each..... 400
1—8x12 Lidgerwood D. C. D. D.... 500
1—12x14 Special Dragline, 90 H.P. (new) 1,500
1—9x10 D. C., 3-drum Cableway Engine 1,500

LOCOMOTIVES

1—Vulcan 36-in. gauge Saddle Tank 1,000
1—Porter Standard Gauge Saddle Tank, 14 tons..... 2,000

PUMPS

1—No. 5 Pulsometer..... 100
1—Wilson-Snyder Water Works, 3,000,000 gals. per day..... 1,500

ROLLERS

1—10-ton Steam Roller..... 1,000

SCREENS

1—42-in. by 14-ft. Screen complete.. 400
2—Stephens & Adamson at $150 each 300

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1—Model 28 Marion Traction, fine.. 4,700
1—Vulcan-Bucyrus Revolving Shovel, standard gauge, perfect..... 3,250
1—70 C. Bucyrus with standard, also stripping booms and dippers.....11,000

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7x10 double drum double cylinder hoisting engine.
6¼x8 double drum, double cylinder hoisting engine.
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Hayward Orange Peel Bucket 1½ yard.
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HOISTS

1—6¼x8, d.e. dd. Lidgerwood with boiler.
1—10½x12, d.c. d.d. and swinger Lambert.

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2—Ingersoll-Rand H8, one with and one without boiler.
1—Sullivan Y-8 with boiler.

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1—950 cu. ft. Ingersoll-Sargent straight line simple steam, two stage air.
1—1,300 cu. ft. Ingersoll-Sargent belted with 200 h.p. 3 ph., 60 cycle, 2,200-volt motor.
1—2,400 cu. ft. Ingersoll-Rand two stage air cross compound with Corliss valves.

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1—60x84 P. & M. Superior Jaw.

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Standard Gage

3—13x18, 4 wh. American Saddle Tank.
1—14x22, 4 wh. Baldwin Saddle Tank.

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1—400 h.p. Squirrel Cage G.E. Motor for 3 ph., 60 cy., 2,200 volts current.

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2—40"x15" Allis-Chalmers "Anaconda" type.
3—54"x24" Allis-Chalmers "Anaconda" type.

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1—No. 70-C Bucyrus 2 yd. dipper.
1—No. 95-C Bucyrus 3½ yd. dipper.
1—No. 100-C Bucyrus 3½ yd. dipper.

Also Drills, Screens, Pumps, Locomotive Cranes, and Road Cranes.

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1—30-ton, four-driver saddle-tank American.
1—40-ton, 17x24 in., four-wheel switcher.
2—50-ton, 18x24 in., six-wheel switchers.
2—18-ton, 10x16 in., 36-in. gauge Vulcans.
2—14-ton, 9x14 in., 36-in. gauge Vulcans.
2—10-ton, 7x12 in., 36-in. gauge Vulcans.

Miscellaneous

1—Monighan dragline, 120-ft. boom, 3¼-yd. bucket.
1—Bucyrus dragline, 60-ft. boom, 2-yd. bucket.
13—16-yd. dump cars.
40—60,000-lb. capacity flat cars.
1—Western standard gauge spreader.
2—1-yd., Foote side-discharge concrete mixers.
50-lb. and 56-lb. rail, ties, 1¼-yd. clamshell bucket, 10 H. P. and 45 H. P. upright boilers, railway equipment, etc.

Industrial Equipment Co.
McCormick Bldg., Chicago, Ill.

STEAM SHOVELS

1—No. 0 Thew Revolving Traction Shovel, Shop No. 876, ⅝-yd. dipper. Price $5,000.00. F. O. B. Joliet, Ill.

1—18-B Bucyrus Revolving Shovel, Shop No. 1821, ⅞-yd. dipper. Price $6,500.00. F. O. B. Hagerstown, Md.

COOLEY BROS.
456 Old Colony Building
Chicago

FOR SALE OR RENT

Full revolving steam traction shovel, ¾.
Bucyrus ½-yd. steam traction.
Sturtevant (Pulverizer).
10-ton, 3-wheel roller.
Stiff leg derrick with 1-yd. clam.
35-ton rod locomotive.

I own above and can ship promptly.
D. B. STRALEY, Crown Point, Ind.

For Sale USED AND REBUILT For Rent
PIT AND QUARRY EQUIPMENT

STEAM SHOVELS

1—"O" Thew, ⅝-yd. dipper.
1—Model 20 Marion, R. R. wheels, 1¼-yd. rock dipper, suitable for quarry or tunnel work.
1—Model 31 Marion, 1-yd dipper.
1—Model 36 Marion, 2-yd Dipper, caterpillar traction.
1—New Type "B" Erie, shop No. about 1035. Never used. Equipped with ¾-yd. Williams Clam Shell Bucket, Boom 36 ft. No dipper for this machine. Additional equipment can be secured.
1—Model 28 Marion, ¾-yd. dipper.

CRUSHERS

1—No. 4 Champion, on skids.
1—No. 4½ Champion, on wheels.
1—No. 5 Champion, on wheels.
1—No. 2 Gates Gyratory.
1—No. 7½ Austin Gyratory.
2—No. 5 Austin Gyratory.

HOISTS—STEAM

1—6¼x8 D.C.D.D. Orr & S. Boiler.
1—8¼x10 3-D. Stroudsburg Boiler, brand new.
2—10x12 D.C.D.D. American-Skeleton.
2—7x8 D.C. Single Drum, American Swinging Engines.
1—7-12 3-Drum Mundy-Skeleton.

LOCOMOTIVES

1—6x10, 36-in. gage, Porter.
2—9x14, 36-in. gage, Porter.
5—10x16, 36-in. gage, Porter, Vulcan and Davenport.
3—11x16 36-in. gage, Porter, Vulcan and Davenport.

CARS

10—1 yd., "V" Shape, 36-in. gage.
10—1½ yd., "V" Shape, 36-in. gage.
30—4 yd., 36-in. gage Western.
10—12 yd. Standard gage Western.

CRUSHING PLANTS

1—No. 2 Climax, Elev., Screens, etc.
1—No. 4½ Champion, Elev. Screens, etc.
2—No. 10½ Acme, Elev., Screens, etc.

DERRICKS, BOILERS, PUMPS, ETC.
WE BUY EQUIPMENT.—What have you for sale?

UTILITY EQUIPMENT CO.

OFFICE
324 4th Avenue
Phone 1257 Court

PITTSBURGH, PA.

Yards and Shops
ROOK, PA.

FOR SALE OR RENT

Owned by Us and Sold Under Absolute Guarantee

STEAM SHOVELS

4—70-C Bucyrus, Shop Nos. 1160, 1268, 1331, 1712, 2¼-yd. dippers.
1—65-ton Bucyrus, Shop No. 394, 2½-yd. dipper.

REVOLVING TRACTION SHOVELS

1—Model 31 Marion on Caterpillar, 1-yd. dipper, Shop No. 3850, good condition, immediate shipment.

DUMP CARS

50—12-yd. standard ga. Western Air Dump Cars.
148—New 20-yd. capacity all steel standard gauge Western Air Dump Cars. Latest type.
100—New 16-yd. capacity standard gauge Western Air Dump Cars; composite type, wood beds and all steel underframes.
15—16-yd. standard ga. Western Side Dump Cars.
22—4-yd. 36-in. gauge Continental Side Dump Cars.
40—4-yd. heavy duty Western 36-in. gauge Side Dump Cars.
2—Western 36-in. gauge Spreader Cars.
20—1½-yd., 24-in. gauge Western Dump Cars.

LOCOMOTIVES

1—Standard gauge, 10x16 Cylinder Porter, 4-wheel, saddle tank Locomotive; air brakes, automatic couplers; weight 19 tons.

1—Standard gauge, 13x18 cylinder American saddle tank Locomotive; air brakes, automatic couplers, side entrance cars, with rear fuel bunker; steam pressure 165 lb.; weight 56 tons; built new 1911.

5—36-in. gauge, 10x16 cylinder Porter, 18-ton, saddle tank Locomotive; Shop Nos. 5065, 5235, 5302, 5304, 5305, extended saddle tanks, wide fire boxes, steam brakes and most modern design and equipment.

10—36-in gauge, 10x16 Davenport, American and Vulcan saddle tank Locomotives.
1—7x12 cylinder, 24-in. gauge Davenport saddle tank Locomotive; weight 9 tons.

ROAD BUILDING EQUIPMENT

6—1½-yd. Western bottom Dump Wagons.

Clapp, Norstrom & Riley Equipment Co.
12 and 14 South Canal St., Chicago

Complete Logging Railway

At Manchester, Vermont
Fair Prices Immediate Delivery

STEEL RAILS—

Approximately 500 tons 74-lb. T Rails and angle bars.
Approximately 500 tons 67-lb. T Rails and angle bars.
Approximately 300 tons 60-lb. T Rails and angle bars.
Frogs, Switches, second-hand Spikes.

LOCOMOTIVES—

One—LIMA Shay geared, 50-ton, standard gauge 11x12 in., two truck, eight drivers; steam and air brakes; built 1914; boiler pressure, 200 lbs. Hartford Insurance.
One—LIMA Shay geared 62-ton, standard gauge, three truck, twelve drivers; steam and air brakes; new Lima boiler installed in 1908; present working pressure, 185 lbs. Hartford Insurance.

CARS—

24—Standard gauge, 60-000 lbs. capacity; double truck; eight wheel LOGGING CARS, 22 ft. long overall; with 24-in. wheels and rails for traveling log loader.
4—Standard gauge 60-000 lbs. capacity; 33-ft. FLAT CARS; air brakes and automatic couplers.
1—Standard gauge, 60,000 lbs. capacity FLAT CAR; with wood water tank and Worthington Pump, hose, etc, for fighting forest fires.
1—Standard gauge, 60,000 lbs. capacity FLAT CAR; rigged with snowplow equipment.
2—Standard gauge Push Cars.
1—Standard gauge Hand Car.

MISCELLANEOUS—

One—Complete Machine Shop; also Cypress Water Tanks, Miscellaneous tools, etc.

The entire plant is now at Rutland Railroad Siding, Manchester, Vermont, ready to be loaded and shipped out. Rails are in tiers, easily inspected and are in good condition for track; each lot of uniform drilling.

Locomotives are in excellent condition, practically as good as new. Cars are of splendid design and in first class serviceable condition.

E. C. SHERWOOD
50 Church Street New York

SAND PUMPS

Two 10″ Morris Steel-Case Centrifugal Sand Pumps, fine condition; immediate shipment.

1,000 other machinery bargains actually owned and on hand for immediate shipment.

Wickes Machinery Co.
Jersey City, N. J.

FOR SALE—EQUIPMENT

STEAM SHOVELS

1—Vulcan Little Giant traction shovel, 1¼ yd. dipper. Good condition.
1—Model "28" Marion revolving traction shovel, ⅝ yd. dipper.

LOCOMOTIVES

2—13″x18″ American standard gauge saddle tank locomotives, steam pressure 185 lbs. First class condition.
1—20 ton Lima standard gauge saddle tank. 160 lbs steam pressure—cyl. 10″x16″.
1—Pittsburgh 40 ton 16″x24″ cyl. standard gauge saddle tank locomotive.
4—10″x16″—36″ gauge saddle tank locomotives.

DUMP CARS

24—Western 36″ gauge 4 yard two way side dump cars, steel underframe, wooden beds.
50—Western 36″ gauge 4 yard two way side dump cars, steel underframe, steel lined.
16—12 yard Western standard gauge air brake and air dump cars.

Also have other equipment. What are your requirements? Wire or write.

THOS. J. DOLAN
76 W. Monroe St., Chicago, Ill.

FOR SALE

1—No. 10—2 stage Alburger centrifugal pump on sub base, can be either belted or motor driven.

1—24x12 Improved Blake type, Allis Chalmers jaw crusher.

Both in stock and condition guaranteed.

Machinery Warehouse Co., Inc.
1455 West 38th St., Chicago, Ill.

FOR SALE

1-10 in. Manganese Steel Dredge Pump, with extra propeller, belted, suction pipe and strainer.

1½ yd. Negley Slack Line Bucket and Carriage.

550 ft. 1⅝ in. Hercules Cable.

1—No 1 3-M Universal Jaw Crusher.

Above all in good condition.

The Carmichael Gravel Co.
WILLIAMSPORT, INDIANA.
Rialto Bldg., St. Louis.

FOR SALE

13 end-dump cars, good condition, wooden, steel lined, capacity 25½ cu. ft., 20-in. gauge, 16-in. Whitney Roller Bearing Wheels, built by Sanford-Day Co.

RAMPUS STONE CO.,
Mascot, Tenn.

FOR SALE

Quarry Leasehold in Philadelphia. Quarry fully equipped with plant and Railroad siding for large contracts.

HOLMESBURG GRANITE CO.
809 Commercial Trust Bldg.,
Philadelphia, Pa.

FOR SALE OR RENT
CONTRACTORS EQUIPMENT

AIR COMPRESSORS

7—Chicago Pneumatic Tool Co. Class N—SGLTM 10½x7¼x10 in., with gas engine and air receiver mounted on trucks. Practically new.

DERRICKS

1—Stiff Leg, boom 16-in. x 16-in. x 80-ft., mast 16-in. x 16-in. x 50-ft., bucket operating, like new.
5—Stiff Leg Derricks, boom 14-in. x 14-in. x 60-ft., mast 12-in. x 12-in. x 32-ft., sills and legs in proportion, Terry & Tench fittings, 2 arranged for clam shell, 3 for single line.
1—Stiff Leg, 40-ft. boom, capacity 3 or 4 tons.
2—Breast Derricks.

HOISTS

1—10x12 D. C., D. D. Lidgerwood, with banked levers, no boiler.
3—9½x12 D. C. 3 drum with boiler, 2 Lamberts and one National with attached swinger.
10—8¼x10 D. C., D. D. with boiler, American, Lambert, Lidgerwoods, Flory, Clyde or Mundy.
15—7x10 D. C., D. D. with boiler, American, Lidgerwood, Lambert, O. & S., Mundy, Clyde and Flory.

STEAM SHOVELS

2—Type O Thew, fully revolving, ⅝ yd. dipper, traction wheels.

EXCAVATORS AND BACKFILLERS

3—Keystone Excavators, steam engine, boilers, complete with skimmer scoops.
1—Buckeye Wheel Type Trenching Machine, No. 4, with gasoline engine, on caterpillar traction.

BUCKETS

1—Brand new 2½-yd. Butler dragline bucket.
1—1-yd. Hayward orange peel.
Several others of various makes and sizes.

WAGON LOADERS

5—Jeffrey Portable gasoline driven traction bucket wagon loader, like new.

CARS

15—34-in. gauge Koppel V-shaped, 1-yd. side dump cars.
35—36-in. gauge, 4-yd. Western side dump cars.
12—12-yd. standard gauge, side dump.

DRAG LINE

1—Insley Drag Line, new, 60 ft. boom, with 1½ yd. drag bucket; with 9x13 National engine, with boiler, like new.

These are only a few items of the equipment we own. If you do not find what you want, write or wire us your requirements.

We are in the market for used equipment of all kinds. Write us, giving full description and price.

Equipment Corporation of America

Land Title Building, Philadelphia, Pa. — **Lumber Exchange Building, Chicago, Illinois** — **Empire Building, Pittsburgh, Pa.**

FOR SALE

Bruce Mines Trap Rock Plant

Located at Bruce Mines, Ontario, harbor, on the northern shore of Georgian Bay.

Consisting of a modern crushing, storage and loading plant, having a crushing capacity of three hundred tons per hour.

Unlimited supply of high grade Trap Rock, the best known material for roads and concrete construction, because of its exceptional hardness, toughness, cementing and fire-resisting qualities.

Cheap transportation to all Great Lakes and nearby territory.

Plant all ready and equipped for immediate operation.

An exceptional opportunity to obtain a plant and equipment at a fraction of its replacement value.

Address—W. S. Edward, Sault Ste. Marie, Michigan, or Perry E. Wurst, 291 Elm St., Buffalo, N. Y.

DREDGES—SAND AND GRAVEL MACHINERY

Now Ready for Delivery

12" Morris extra heavy dredging pump arranged for electric drive.
3 drum Flory hoist directly connected to 10 H.P. motor, complete with control.
1½"—three stage Morris centrifugal priming and general service pump directly connected to 5 H.P. motor.

These three pieces comprise the essential equipment for a 12" electrically driven suction dredge. This equipment is of the latest design and of very rugged construction. The pieces have never left the manufacturer's shop and are now on the floor ready for immediate shipment. This is the only opportunity to get new equipment of this sort in less than five months delivery. Plans for hull and machinery arrangement can also be furnished.

USED EQUIPMENT

5½-yard Marion dipper dredge fully equipped, in excellent condition, hull 105'x40'x9'.
1—10" patented Morris manganese lined belt driven dredging pump suitable for pumping coal, sand, gravel or tailings.
1—12" extra heavy belt driven Morris sand pump.
1—Standard cutter ladder for 12" dredge complete with engine, gears, trunnions and A frame fittings.
1—Symons disc crusher No. 30.
1—8½x12" single drum Mundy hoist with boiler.
1—single drum Flory electric hoist with 42"x 38" drum.
2—2 yard Steubner bottom dump buckets.
1—8" suction dredge, hull 50'x21'x38", Morris dredging pump driven by Fairbanks Morse Oil Engine.

PIERCE J. McAULIFFE

17 Battery Place — New York City

FOR SALE

LOCOMOTIVES

1—Consolidated 19x26" standard gauge, 70 ton.
1—Consolidated 18x24" standard gauge 65 tons.
1—Saddle Tank Vulcan 14x20—40 ton.
2—Mogul 36" gauge—30 ton.
1—13x18 American Saddle Tank standard gauge.
2—11x16 Vulcan 36" gauge Sadde Tank.
4—10x16" Vulcan 36" gauge Saddle Tank.
3— 9x14 Porter 36" gauge Saddle Tank.

CARS

60—60,000 capacity Box, standard gauge.
65—80,000 capacity Gondola, standard gauge.
18—12 yd. 2 way Western air dumps, standard gauge.
42—4 yd. 36" gauge steel underframe 2 way dump cars.
10—1¼ yd. 24" gauge Western 2 way dump cars.
7—1½ yd. 30" gauge Western 2 way dump cars.

SHOVELS

1—Marion Model 61, 2½ yd. capacity.
1—Marion Model 60, 2½ yd. capacity.
1—70 C Bucyrus 2½ yd. capacity.
1—Atlantic 2½ yd. capacity.
2—Erie type B ¾ capacity.
1—Marion 31 caterpillar, 1 yd. capacity.
1—Bucyrus 18 B caterpillar ⅝ yd. capacity.
Hoisting Engines, Boilers, etc.

Thomas F. Carey Co.

120 Liberty St.

NEW YORK CITY, N. Y.

CRUSHERS

1—8x14 Reliance mounted on wheels, practically new.
1—10x18 Reliance mounted on skids.
1—9x16 Climax mounted on skids, over-hauled, new jaws.
1—10x18 Acme mounted on skids, elevator and screen.
1—13x24 Farrell, practically new.
3—No. 4 McCully Gyratory.
1—No. 7½ McCully manganese fitted, used one week.

COMPRESSORS

1—Ingersoll Rand "Imperial" 10x12x18, capacity 888', 150 H.P. Motor, 440 volt, 3 phase 60 cycle, A-1 condition.
1—McKiernan 20x20x24, straight line 800'.
1—Ingersoll Rand on trucks, Fairbanks Gasoline Engine capacity 134'.

STEAM SHOVELS

1—A-1 Thew traction good working condition
1—⅞ yd. Bucyrus caterpillar traction.
1—1½ yd. Marion caterpillar traction.
3—Model 60 Marion standard gauge 2½ yd. dipper.
1—Model 80 Marion 3½ yd. dipper.
1—Model 65 Bucyrus Massachusetts boiler 2½ yd. dipper.

OTHER EQUIPMENT

1—Parsons E-48 Trench Excavator.
1—Dull Dragline Excavator, 1½ yd.
1—No. 5 Leyner drill sharpener.
1—100 ton Buffalo Track Scale 40' platform.
1—No. 1 Union Pile Hammer.

Also hoists, derricks, buckets, and contractors' equipment, overhauled at our shops.

THE HUBBARD-FLOYD CO., INC.

Boston Office: Old South Building Main 4233 — MAIN OFFICE Grand Central Palace, New York, N. Y. Vanderbilt 1465 — Philadelphia Office: Land Title Building Spruce 4745

A. C. AND D. C. MOTORS AND GENERATORS—NEW AND USED—NEW GENERAL ELECTRIC SLIP RING MOTORS—CHICAGO STOCK

2—150 HP, 440 v., 600 RPM Motors.
1— 50 HP, 220 v., 900 RPM Motor.
1— 15 HP, 220 v., 1200 RPM Motor.
1—7½ HP, 220 v., 1200 RPM Motor.
1— 35 HP, 220 v., 1200 RPM Motor.
2—50 HP, 125 v., Western Elec. direct current generators, dir conn. to Erie Ball engines.
1—75 HP, 220 v., General Electric, 900 RPM, type ITC, crane type, 3 phase, 60 cycle motor, complete.
1—100 KVA, 2300 v., 900 RPM, Western Electric, 3 phase, 60 cycle, alternator, complete.
1—150 KVA, 2300 v., 600 RPM, Fort Wayne, 3 phase, 60 cycle alternator, complete.
1—175 KVA, 440 v., Allis-Chalmers, 3 phase, 60 cycle alternator, complete. USED THREE MONTHS.

CHICAGO ELECTRIC COMPANY

(Formerly Chicago Elec. Const. Co.)

740 W. Van Buren Street — CHICAGO

USED MOTORS

For Immediate Delivery—Overhauled and Guaranteed—Largest Stock in America to Choose From. For Sale: 3 Phase, 60 Cycle, 220 V.

	H.P.	Speed
1—	3—General Electric	1800
1—	3—Westinghouse	1200
1—	5—Wagner	1800
1—	5—Allis-Chalmers	1200
1—	7½—General Electric	1800
1—	10—Westinghouse	900
2—	15— " Type CCL	1750
2—	15—Watson, slip-ring, var. speed	1720
1—	15—Fairbanks-Morse	1200
1—	15—General Electric, Form L	1200
1—	15—General Electric	1200
3—	15—Fairbanks-Morse, slip-ring, constant speed	1200
1—	15—Westinghouse, vert.	1135
2—	15—Allis-Chalmers	1130
2—	15—Allis-Chalmers	860
2—	15—Westinghouse	850
4—	20—Westinghouse	1750
1—	20—General Electric	1200

Send for MONTHLY BARGAIN SHEET, showing complete stock and net prices.

GREGORY ELECTRIC CO. CHICAGO, ILLINOIS

LOCOMOTIVE CRANES

35-ton McMyler.
15-ton, 8-wheel Brown Hoist.
5-ton Industrial.

LOCOMOTIVES (36" Gauge)

4—Porters, 9x14, Saddle Tank.
4—Porters, 11x16, Saddle Tank.
2—Vulcans, 10x16, Saddle Tank.
2—4-ton Bell Oil, 24-in. Gauge.

LOCOMOTIVES (Standard Gauge)

1—35-ton Saddle Tank.

BUCKETS

1—2-yard Brown Hoist Clamshell.

CARS

1—Passenger Car, Standard Gauge.
1—Box Car, Standard Gauge.

HOISTS

1—8¼x10 Kendall D.C. D.D. Boiler.

FLAT CARS

80—Standard Gauge, 50,000-lb. cap., with stake pockets.

DERRICKS

10 to 30 tons.

HOISTING MACHINERY CO.,
Hudson Terminal Building
New York

DANIEL HAUER

1804 N. Charles St.
BALTIMORE, MD.

Consulting Engineer
Construction Economist

Associate Editor
PIT AND QUARRY

Expert in Pit and Quarry Operations

Devises real cost keeping systems to suit YOUR Business

Better Methods and Modern Management

The same work for less money; more work for the same money

Electric Hoist Motors

2—75-HP. G. E., D. C., hoist motors, complete with resistance and drum controllers, 230 volts.

Centrifugal Pumps

1—Dayton centrifugal pump, 5" suction, and 4" discharge, complete with accessories.

1—Worthington centrifugal pump, 6" suction and 8" discharge, complete with accessories.

2—4" Morris Machine Works electric centrifugal sand pumps, with or without motors.

1—12" Morris Machine Works electric centrifugal sand pump with or without motor.

For quick sale, very cheap.

2000 Other Bargains in Motors

NATHAN KLEIN & CO.

Baxter, Centre and Howard Sts.

NEW YORK CITY

FOR SALE

STONE CRUSHING PLANT

located in Missouri. Capacity 800 tons per day, fully equipped, 30 foot ledge, light stone, no stripping, no competition. 1600 foot side track maintained by railroad. Other interests compel owner to dispose of this property. Price attractive, terms to suit purchaser. Address Box 60, Pit & Quarry, 538 S. Clark St., Chicago, Ill.

WANTED

Dinkey locomotives, 7, 9, 12, and 14 ton in the Davenport and Vulcan make. Will accept them in any condition that will justify our rebuilding and repairing same. Quote us your lowest cash price.

THE PITTSBURG BOILER & MACHINE COMPANY
Pittsburg, Kansas

MOTOR TRUCKS

2 -ton Jeffrey Quad side dump body.
3½-ton Sterling dump truck.
3½-ton Indiana dump truck.
5 -ton Sterling dump truck.
2½-ton Sterling Chassis.
3 -ton Garford Chassis.
6 -ton Sauer Chassis.

We also have excellent bargains in cranes, steam shovels, concrete mixers and pavers, boilers and engines.

Bonsack Machinery Company
1601-4 Boatmen's Bank Bldg., St. Louis, Mo.

FOR SALE

Two Berg Dry Presses in excellent working condition. Capacity, 18,000 to 22,000, 9-inch brick, 10-hour day. These are offered at a bargain. Write us for further particulars.

A. P. GREEN FIRE BRICK CO.
Mexico, Missouri

FOR SALE

1—Type "B" Erie Traction Shovel.
1—14-B Bucyrus Traction Shovel.
1—Model 31 Marion Traction Shovel.
1—No. 0 Thew Traction Shovel.

Everything for the Contractor. New and Used. Send us your inquiries.

W. E. KENNEDY CO.,
Union Bk. Bldg., Pittsburgh, Pa.

WANTED

About a 13-ton, 36" gauge locomotive and 15 or 20 Austin, end dump, two yard capacity, 36" gauge quarry cars.

NEWTON COUNTY STONE CO.,
Box 213 Kentland, Ind.

WANTED

2 BELL TYPE

LOCOMOTIVES

24" gauge, with tenders attached. Need not be in first-class condition, but suitable for rebuilding.

C. W. PARKER, Leavenworth, Kans.

FOR SALE

Twenty-one 14' 15" I beams, weight 42 lbs. to the foot. Located at Yellow Springs, Ohio.

The Cedarville Lime Co.,
Cedarville, Ohio.

ROCK QUARRY SITE

FOR SALE—Rock quarry site, only half mile from railroad. Apply to **H. W. HALL, Emporia, Va.**

For a list of unusually good bargains in

QUARRY EQUIPMENT

Hoists, Engines, Crushers, Boilers, Wire Rope, Rock Drills, etc.

Write for our Latest Big Bulletin.

ZELNICKER IN ST. LOUIS

POWER EQUIPMENT

AIR COMPRESSORS
Steam and belted, 100 lb. working pressures, 250 to 2500 ft.

BOILERS
Tubular and Vertical, all sizes, 10 to 150 hp.

ENGINES
Corliss, Plain and Vertical. All sizes, special bargains on Corliss stock.

HOISTS
Steam and Electric.

Ask for our stock sheet of strictly first-class used machinery.

LANDRETH MACHINERY CO.
Joplin, Mo.

Gas and Oil Engines

Slightly Used—Prompt Delivery

60 H.P. Fairbanks Morse
50 H.P. Fairbanks Morse
40 H.P. Fairbanks Morse
25 H.P. Fairbanks Morse
20 H.P. Fairbanks Morse
15 H.P. Fairbanks Morse
50 various sizes of other makes.
I pay cash for good engines—what have you for sale?

A. H. McDONALD
548 W. Monroe St. Chicago, Ill.

16 CABLEWAY EQUIPMENTS

16—7x10 Double drum Stroudsburg Engines, fitted with link motion; drums 24"x24", with rear one having concave ends for transversing line. As good as new.
32—Oregon Pine Masts, 72' to 92' long! average dia. 17".
50,000 ft. ⅝" 6x19 C. S. Wire Cable.
15,000 ft. 1⅜" 6x19 C S Hauling Wire Cable.
50,000 ft. 1¼" Galvanized Wire Cable.
And all the Clips, Guys, Blocks, Shackles, Sheaves, Frames, etc., from the above equipment. All this is practically new and ready for immediate delivery. Inspection at Bostton.
Second-hand Tanks, Pipe Iron, Tubes, Beams, Boilers, Smoke Stacks, Rails Radiators.

THE PERRY, BUXTON, DOANE COMPANY
214 West First Street, South Boston 27, Mass.

FOR SALE

10—1½ yd. 24" gauge all steel Koppel Cars.
4—1½ yd. 30" gauge all steel Koppel Cars.
7—1½ yd. 24" gauge, with wood dump bodies, almost new.
Several Compressors of different capacities and sizes. Steam and electric driven.
1—12x30" Farrell Jaw Crusher.
1—No. 4 Champion Portable Crusher 9x15, with power loader and screen.
Clam Shell Buckets from ½ yd. to 3 yd.
Several Stiff Leg Derricks.
3—7x10 Hoisting Engines, D. D. with Boilers, exceptional bargains.
1—9x10 Lidgerwood triple drum.
1—Steel Guy Derrick, 100 ft. mast, 80 ft. boom.

FORSYTHE BROTHERS
Phones Cortlandt 340-677 30 Church Street
New York City

FOR SALE

2½ yard Marion R. R. Shovel $5,000.
20-ton McMyler $11,000.
Boilers, Boilers, Portable Air Compressors, Dump Cars, 5 Hoisting Engines, Generators.

SEYMOUR ENG. CO.
115 So. Dearborn St., Chicago

FOR SALE

SAND AND GRAVEL PUMPING OUTFIT, complete, consisting of one 10" Morris Pump, direct connected to double 9x9 engines. One Scotch Marine boiler 11'6"x11'6", about 200 H.P., allowed 150 lbs. One Bartlett & Snow Crane, 50' steel boom, 1-yd. bucket.

M. A. CALLAHAN, The Sand Man
Schofield Bldg. Cleveland, Ohio

FOR SALE OR RENT

Keystone Excavator.
65 ton Bucyrus shovel, 2½ yd.
Thew shovel, ⅝ yd.
24-in. gauge industrial outfit.
Cars, 24-in. V-shape dump and brick.
Steel forms, Blaw and Heltzel.
20 ton Shay locomotive.
Sturtevant Ring Roll Mill.

D. B. Straley, Crown Point, Ind.

WANTED

Two good second-hand 4" or 6" Sand Pumps with all the equipment such as suction hose ells and etc.

CANTON FUEL CO. Canton, Mo.

EQUIPMENT FOR SALE

1—14x21 Bal. Val. S. C. Engine.
1—22x5 ft. Tube Mill, complete.
4—No. 4; 1—No. 2 Nye Sand Pumps.
400 ft 4-in. pipe; 500 ft 2-in.; 1,000 ft 1½-in. pipe.
All good condition.

PORTAGE SILICA CO., Portage, Wis.

LEATHER RUBBER **BELTING** STITCHED CANVAS

An Enormous Stock of New and Used Power Transmission Machinery, Belting, etc.

TEUSCHER & SON MACHINERY SUPPLY CO.
527 N. Second St., St. Louis, Mo.
Send for No. 186 Bargain Book.

FOR SALE

Thew Type O. Shop No. 1163, ¾-yd. Grading Dipper, ½-yd. sewer dipper, combination boom, in excellent condition, Minneapolis location.

Marion-Model 28—¾-yd. Dippers, Shop No. 2801—Boiler needs refluing, South Dakota location.

Marion Model 20, Shop No. 1703, 1—¼-yd. Dipper R. R. Type, good condition, Minneapolis location.

Four Drag Lines, 1, 1½, 2, and 3-yd. Page Bucket Capacities.

One Thomas Electric Company Drag Line Hoist, 90 HP. 3 phase, 60 cycle, 220 or 440 volt, with two 1½-yd Buckets all Cable and Sheaves, used six months.

American Clay Machinery Company Rotary Dryer, 48"x60 ft. complete, used three years.

Crushers, Screens, Dry Pans, Clam Shells, Orange Peals and Rail 20 lb. to 60 lb.

Industrial Engineering Company

354 Plymouth Bldg., Minneapolis, Minn.

FOR SALE

Rock Crushing and Agricultural Lime Stone Plant for sale, located in Central Florida. Sale for entire output at good price. Plenty of labor. Address Box 71, PIT and QUARRY, 538 So. Clark St., Chicago, Ill.

FOR SALE

Porter 24" gauge, 8x14 saddle tank, splendid condition. In Chicago.

Hayward 5' standard orange peel bucket.

WANTED

Locomotive cranes and drag lines.

WILLIS SHAW

Railway Exchange, Chicago

Situation Wanted

As suction dredge operator by man of extensive experience and with good references. Address Box 75, care of PIT AND QUARRY, 538 S. Clark St., Chicago, Ill.

PUMP BARGAINS

Simplex, Duplex, Triplex, Rotary, and Centrifugal. Over 50 Steam and Power Pumps in Second Hand as is condition free of fatal defects. Will quote if desired. Rebuilt and guaranteed for one year.

Also several small Engines, Pump Governor, Gate Valves, Etc.

FURNESS BROS. CO.

1615 W. Walnut St., Chicago, Ill. West 4326

IF YOU DON'T SEE
WHAT YOU
WANT
ADVERTISED

Write

PIT *and* QUARRY

Rand McNally Bldg.
CHICAGO

FOR SALE

Three No. 3 A. H. & D. Horse Power hoists.

One No. 2 portable Aurora stone crusher complete with screen and elevator. Good condition. Bargain.

Wisconsin Granite Company,
Chamber of Commerce Bldg., Chicago, Ill.

FOR SALE

One type "O" Thew automatic Steam Shovel. ⅝-yd. bucket. First class condition.

BALDWIN BROTHERS
Erie, Penna.

STEAM SHOVELS

1—A-O Thew Steam Shovel, on traction wheels, with ⅝-yd. dipper.

1—Model 18 Osgood Steam Shovel, on traction wheels; ¾-yd. dipper.

1—No. 0 Thew Steam Shovel, on traction wheels, with ¾-yd. dipper, combination boom, can be changed to shipper shaft.

1—Marion Model 28 Steam Shovel, on traction wheels, with ⅝-yd. dipper.

2—Model 3 Keystone Machines, with extra clam shell bucket and extension boom.

Midwestern Company
140 South Dearborn Street

DRAGLINES

1—Bucyrus Class 24, NEW, with 100' boom and 3½ yd. bucket.
This machine is brand new, and immediate delivery can be made.
1—Monighan, type A, with one yard bucket on traction wheels.
1—Marion model 228 with 90' boom and 2 yd. bucket, immediate delivery.
1—Monighan No. 2 with 60' boom and 2 yd. bucket. Good shape.
1—Monighan 3 T with 60' boom and 3 yd. bucket.

SHOVELS

1—Bucyrus 70 C with 2½ yd. dipper on railroad trucks.
1—Bucyrus 175-B, double propelled. Standard equipment.
1—Marion, model 20, with 1¼ yd. dipper, on railroad trucks.
Also buckets, cableways, locomotives, crushers, and etc.

LEONARD F. SMITH & COMPANY
Citizens National Bank Bldg.
SOUTH BEND, IND.

IMMEDIATE DELIVERY
Send us your inquiries

4—No. 6 Gates (Mang.) nickel steel shaft.
1—No. 8 Gates Reg. drive
1—NO. 4 CRUSHING PLANT, MOTOR DRIVEN.
2—28-in. x 12-ft. Taylor (Mang.) Screens.
Locomotive Type Boiler, 90 HP.
Air Compressors (Steam, Belt), 50-400
40 Boilers 60-150 HP., 100-150 lbs.
1—30-60 Emerson Brantingham Tractor
1—18 ton Gallon Loader & Bin
2—36-in. & 48-in Symons Disc. Crushers
1—3D and 2D Crushers
1—5D Gates Crusher (Reg. Drive)
1—7½ Austin Crusher (Reg. drive)
Gasoline Locomotives - Pavers - ⅝-in. cable-engines, contractors' equipment, etc.
2 car loads piping—2" to 12", valves, fittings, etc. 65% present prices.

ROSS POWER EQUIPMENT CO.
Indianapolis, Ind.

FOR SALE

25 Gyratory Crushers, 20 Jaw Crushers, from No. 2 to No. 21, from 6x10 to 60x84.

50 Pulverizers, every type. Coal Crushers, Ore Washers, Channelling Machines, Grinders, all types Screens, Locomotives, Cars, Rails, Steam Shovels, Dragline Machines, Dredges, Corliss Engines, Water Tube and Return Tubular Boilers, Turbo Generators, Direct Connected and Belted, also Fuel Oil Direct Connected Sets, Heavy Fuel Oil Engines, Electric Fuel Oil Locomotives, Compressors, Drills, Cutting and Channeling Machines, Stone Derricks, Electric and Steam Hoists.

J. F. DONAHOO CO., Birmingham, Ala.

Quarry Bargains

1—24x13 and 1—36x18 Farrell Crusher, elevator screens, 2—100 hp. Boilers and Engines, etc.

1—No. 3 Gates and 1—No. 6 Allis-Chalmers Crushers, elevator, screens, 150 hp. Ball Steam Engine.

Complete line of Locomotives, Shovels, Cars, Graders, and general line of quarry and contractors' equipment.

FRANCIS E. B. O'BRIEN
Phone Spruce 2262
41 So. 15th St. Philadelphia, Pa.

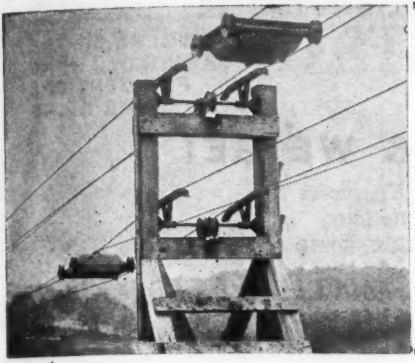
There are many excuses for not belonging to the A. B. C. There is only one **reason.**

EVERY DOLLAR spent for advertising in a publication which misrepresents its circulation and thus obtains money under false pretenses is a dollar lost to the publishers who give full value. But more than that—it is a dollar misspent by the advertiser and for which he does not get a dollar's value.

In their own defense, therefore, the "above board" publishers have an independent audit made of their circulation records by the Audit Bureau of Circulations, and invite their competitors to do likewise.

When excuses or evasions are given for declining the challenge, the advertiser can draw his own conclusions.

PIT AND QUARRY is a member of the Audit Bureau of Circulations. There are no hidden mysteries about its circulation records.



Solve Your Hauling Problem

Independent of slides, bad roads and rough country.

Lawson Automatic Tramway

Easy to Install and Operate
Low Upkeep and Labor Cost
Write today for our booklet

Interstate Equipment Corporation

Shops at Roanoke, Virginia
135 Broadway New York

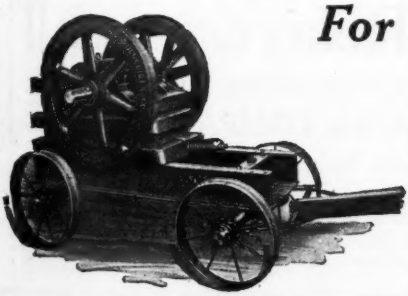
ROBERT W. HUNT, JNO. J. CONE, JAS. C. HALLSTED, D. W. McNAUGHER

ROBERT W. HUNT & CO.

INSPECTION—TESTS—CONSULTATION

INSPECTION OF NEW AND SECOND HAND CARS, LOCOMOTIVES, CRANES, DREDGES, STEAM SHOVELS, PUMPS, ENGINES AND ALL CLASSES OF QUARRY EQUIPMENT.

NEW YORK PITTSBURGH **CHICAGO** ST. LOUIS SAN FRANCISCO



For Road Building—

You can produce more crushed limestone or other product with less power, in less time, by using a GRUENDLER CRUSHER.
Are simple, rugged, correct in design, give greatest capacity for power required, last indefinitely and are practically free from interruption of operation. Write for illustrated bulletin giving particulars.

Gruendler Patent Crusher & Pulverizer Co.

905 North Main St. St. Louis, Mo.

INDUSTRIAL CARS

of all types

PORTABLE TRACKAGE

Rails, Switches, Etc.

Ask for Catalog No. 10

International Clay Machinery Co.

Dept. C DAYTON, OHIO

LIME CALCINING AND HYDRATING PLANTS OUR SPECIALTY

BUILDERS OF THE "ARNOLD" LINING FOR VERTICAL LIME KILNS

ARNOLD & WEIGEL

Contractors and Engineers
Blausey Building
WOODVILLE, OHIO

Write for our booklet "The Arnold Lining for Lime Kilns"

Patents Secured to Protect Inventions

Royal E. Burnham
Patent Attorney

Continental Trust Bldg., Washington, D.C

TRADE MARKS
Registered in United States Patent Office

WANTED

Sales engineer, experienced in quarry and crushing equipment to sell our gyratory crusher line. Experience in laying out and selling essential.

AUSTIN MFG. COMPANY
910 S. Michigan Ave., Chicago

Rails!! New & Relayers Rails!!

Write or wire us when in the market to Buy or Sell.

HYMAN-MICHAELS COMPANY
P-533 Peoples Gas Bldg., Chicago

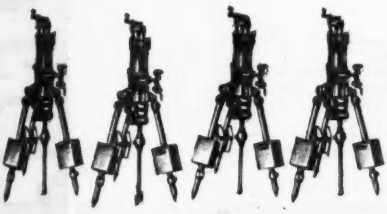
BRANCH OFFICES: First National Bank Bldg., Pittsburgh, Pa.; Railway Exchange Bldg., St. Louis, Mo.; East Chicago, Ind.; 35 Nassau St., New York.

YARDS AND WAREHOUSES: No. 1—East Chicago, Ind.; No. 2—Adelaide and Bulwer Ave., St. Louis, Mo.; No. 3—Broadway and Humbolt, St. Louis, Mo.

U. S. Crane Co.
Peoples Gas Bldg., Chicago
LOCOMOTIVE CRANES
Strongest—Most Accessible
for Proof: See Our Crane
Get Our Specifications

"Stronghold" Belt
Specially constructed for Conveyors, Elevators and Drives.
Guaranteed to figure Economy
Manufactured by
Corns Conveyor Belt Co.
CHICAGO

WOOD DRILL WORKS



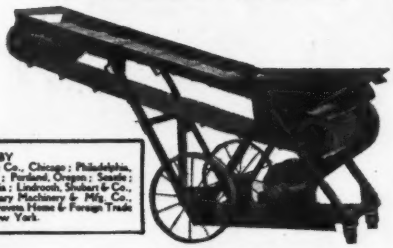
Paterson, N. J.

ROCK DRILLS
and
Hammer Drills

all sizes and for
all purposes.

A new model for loading Sand, Gravel, Lime, Salt, Phosphates and other materials. This Loader "works like a wheel-barrow." It is easily handled and earns its cost rapidly, without injuring fragile materials. We make 7 types of Box-Car Loaders. This one is "Type P." Write for particulars. "It's a 'great' little machine."

THE MANIERRE
BOX CAR LOADER



Address "Manierre"
Colby-Abbot Building
MILWAUKEE, WISCONSIN

REPRESENTED BY
The Link Belt Co., Chicago; Philadelphia, Pittsburgh, Pa.; Portland, Oregon; Seattle; British Columbia; Lindrooth, Shubert & Co., Denver; Calgary Machinery & Mfg. Co., Alberta; Yeomans, Hume & Foreign Trade Co., Inc., New York.

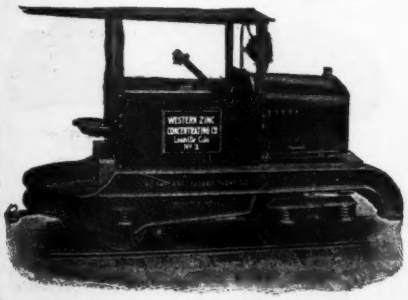
TOWER DRYER
FOR
Sand, Gravel and Cement Plants

INSTALLATION, OPERATING and REPAIR COSTS
CUT IN HALF

"FARREL" STYLE "B" CRUSHERS

Complete Crushing, Screening and Washing Plants
for Sand and Gravel Bulletin C-2

EARLE C. BACON, Inc., Engineers 26 CORTLANDT ST., N.Y.



A Gasoline Locomotive
with a
Ford Engine Power Plant

adapted for very short curves
18 in. to 36 in. Gauge
300-lb.-600-lb. Draw-bar Pull

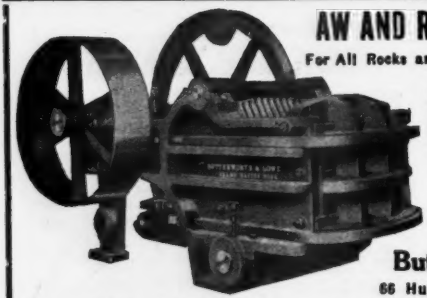
Practical : : Economical

Send for Catalog

The McFARLANE-EGGERS Mchy. Co.
2763 Blake St.
Denver, Colo.

LOCOMOTIVE CRANES — TIMBER & STEEL DERRICKS

LET US SOLVE YOUR MATERIAL HANDLING PROBLEMS



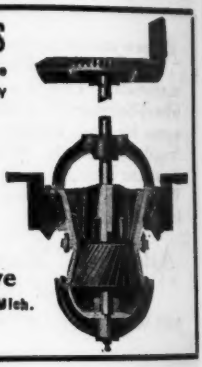
AW AND ROTARY CRUSHERS

For All Rocks and Ores Softer Than Granite

GYPSUM MACHINERY

We design modern Plaster Mills and make all necessary Machinery, including Kettles, Nippers, Crackers, Buhrs, Screens, Elevators, Shafting, etc.

SPECIAL CRUSHER-GRINDERS FOR LIME



Butterworth & Lowe

66 Huron Ave., Grand Rapids, Mich.

Nippers—17x19", 18x26" 20x30", 24x36" and 26x42".

Rotaries—20" to 47" inside diameter. Many variations.

STOP PICKING; PICK THE "ADEN"

"ADEN"

HEAVY SERVICE

Grab Buckets

MANUFACTURED BY

The Advance Engineering Co.

Office and Works, 6539-41 Metta Ave.

Cleveland, Ohio

Union Steel Rivetless Chains

"The Chain of Double Life"
Fits Cut and Std. C. I. Sprockets
1 to 12 in. pitch.

High Carbon Links (STRENGTH) Large Glass—Hard, Reversible Bearings (DURABILITY), One-Piece Rivetless Construction (PERMANENCY) insure Trouble-Proof Money Saving Service. Bushing Chains, Roller Chains, Attachment Links, Buckets, Sprockets, Elevators, Conveyors, etc.

THE UNION CHAIN & MFG. CO. Seville, Ohio.

WHEELS

Cast Iron — Chilled — Annealed.
Plain or Self-Oiling Hubs.
Plate or Spoked Type.

Forty years' experience in this line

Hockensmith Wheel & Mine Car Co.
Penns Station, Pa.

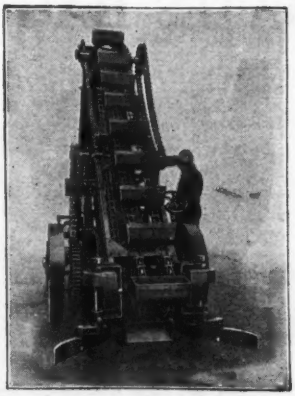
CRESCENT BELT FASTENERS MAKE GOOD BELTS GIVE BETTER SERVICE

THEY DO- AND MORE.

They insure Continuous Production

They save time labor & Belting

Crescent Belt Fastener Co
381 4th Ave
New York



AUSTIN
Self-Feeding Wagon Loader

The Running Efficiency of a Wagon or Truck Depends on the Time it Takes to Load.

When the truck or wagon is being loaded, both it and the drivers are idle. The length of time it takes to load, determines the efficiency of your delivery system and the number of deliveries made.

Austin Self Feeding Wagon Loader

adds 80% to the running efficiency. An actual test showed that it took six minutes to load a 5 cu. yd. truck with an *Austin* Loader, whereas it took two men 45 minutes to load the same truck. In the same test the truck made 16 trips when loaded with an *Austin* as against 8 trips when loaded by hand.

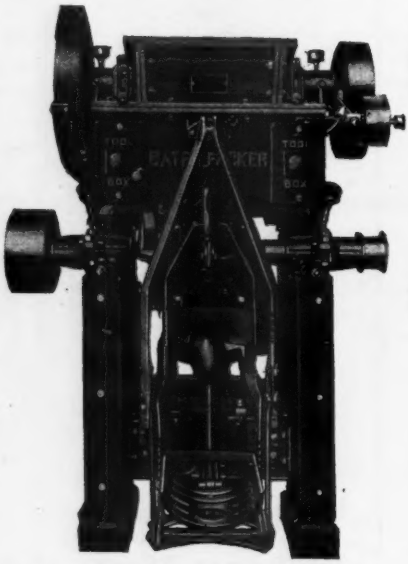
Apply these figures to your situation and see how much saving in time and money an *Austin* will effect in your outfit.

Operated by gasoline or electric power.

Write for full information concerning the *Austin* Loader. Booklet W. L. 16.

Austin Machinery Corp.
F. C. Austin Consolidation
Railway Exchange Bldg., Chicago, Ill., U. S. A.

BATES BAG FILLING MACHINE



Less Labor
Greater Output
Reduced Cost

Used universally for packing pulverized rock products.

Bates Valve Bag Company
7310 South Chicago Ave.
Chicago, Ill.

They produced Limestone at 10 to 15 Cents a Ton and

Then They Bought THREE MORE

American Ring Pulverizers

There is a demand for limestone and furnishing this product can prove an added source of profit in quarrying. Our pulverizer with its rolling ring action is highly efficient, and low in power consumption and in upkeep.
Write for Catalog 53.

Here's What They Say:

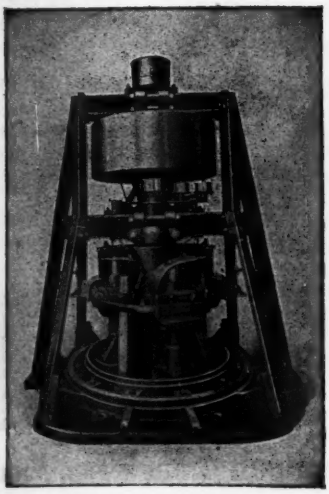
Gentlemen:—

After investigating different pulverizer constructions, we were advised by good authorities to purchase one of the American Pulverizers, especially suited for grinding limestone. Up to now we have ground over ten thousand (10,000) tons of limestone in the last three (3) months, with your machine No. 36 and we can say that the amount of power used by your machine, is very low and the cost of production per ton of limestone, is running from ten cents to fifteen cents per ton.

We shall be glad to double our orders next spring.

Yours very truly,
COLUMBIA QUARRY COMPANY,
C. P. Tigges,
Secretary.
St. Louis, Mo.

American Pulverizer Company
18th & Austin Sts., St. Louis, Mo.



The Perfect Agricultural Limestone Pulverizer

THE BRADLEY 3 ROLL MILL

Produces a very fine, uniformly-ground product at minimum cost. A mill built to meet the demands of the most exacting trade.

Produces a fine-ground product cheaper than most other machines when producing coarse materials.

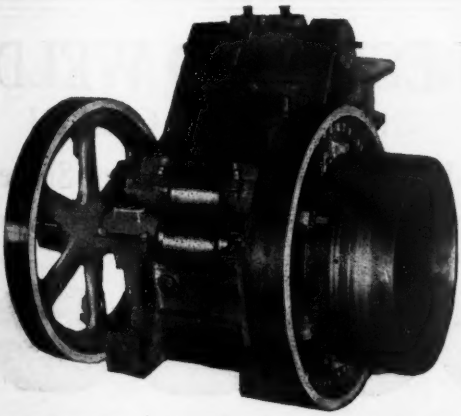
Finishes in Single Operation

We are prepared to furnish complete plans for agricultural limestone plants.

Catalog 42 Upon Request

BRADLEY PULVERIZER CO.

BOSTON LONDON Works: ALLENTOWN, PA.



RELIANCE

The Crusher with the Longer Life.

All **RELIANCE** Equipment is built to meet the hardest conditions and to operate at an extremely low maintenance cost.

We manufacture a complete line of

QUARRY AND ROAD-BUILDING EQUIPMENT

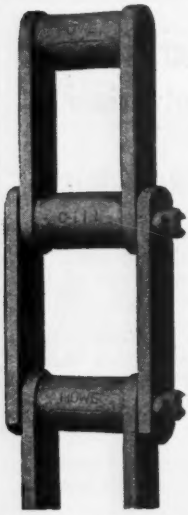
WRITE US FOR CATALOGUE AND PRICES

Prompt Deliveries

Universal Road Machinery Co.

Kingston, N. Y.

Canadian Representatives F. H. HOPKINS & CO., Montreal and Toronto



Howe Double-Locked Combination Chain is a development of old type combination Malleable Iron and Steel Chains, which for years have been constructed with pins or rivets flattened at one end only to lock them to the side links.

The outstanding feature is the double-locked pin, machined flat at both ends, driven tight into machined holes in the side links, actually integral with the side links. These pins cannot work loose and wear in the side links. All wear takes place over large area between pin and barrel of center link—elongation is minimized. High Carbon Steel pins and side links, with Charcoal Malleable Iron center links, further guarantee non-stop performance under heavy service.

Howe Charcoal Malleable Iron Elevator Buckets—Highest quality castings, uniform throughout, with clean, straight edges. All buckets reinforced at corners to add to strength and durability. Large stocks of standard styles and sizes always available.

Write for Catalog 100.

Howe Chain Company, Muskegon, Michigan

Howe Chains-Buckets

"HERCULES SOLID WELD"
STEAM SHOVEL CHAIN

The Chain That Puts the Shove in Steam Shovels

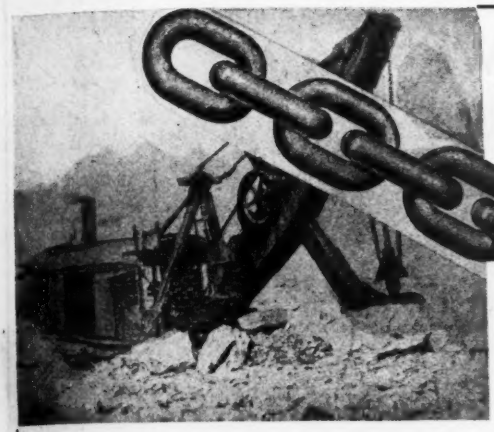
In use for many years. Will not open at weld or go to pieces before it actually wears out.

Manufactured only by:

The Columbus McKinnon Chain Co.

Columbus, Ohio

Canadian Factory:
THE McKINNON COLUMBUS CHAIN, LTD.,
ST. CATHARINES, ONT.



If You Will Link Your Steam Shovel Operation to the Quality in

TAYLOR MESABA CHAIN

you will have uninterrupted, satisfactory service covering a long period of time. There's 47 years' manufacturing experience back of our claim.

TAYLOR MESABA CHAIN is hand forged from selected, carefully tested high grade iron. It has short links, properly welded and possesses strength and endurance.

Sizes carried in stock for immediate shipment; ⅞", 1", 1⅛", 1¼", 1⅜", 1½", 1⅝".

Descriptive circular on request.

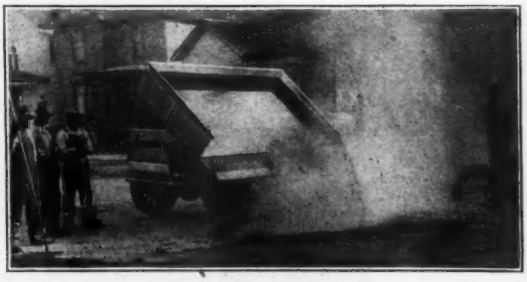
S. G. TAYLOR CHAIN COMPANY

138 S. Dearborn St. Chicago, Ill.

DEALERS

Get after the Side-Dump Body Business, and increase the output of Trucks.

with a



Side View

AUTOMATIC SIDE DUMP BODY

To increase the Sales of Trucks put on a Side Dump Body and watch your Business Grow.

Dumps in any weather.
No lost space back of driver's seat.
Can't break down and get out of order.
Will outwear any truck.
Dumps a 3-yard load in a minute and half.
Dumps all the load off without operating Truck.

Fits any Chassis.

Write for attractive Dealers' Contract.

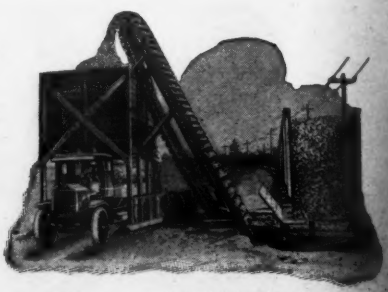
AUTOMATIC DUMP CAR COMPANY

1600 Ernsperger Street Sales Dept. A. SOUTH BEND, IND.

Here's What We GUARANTEE

When equipped with proper size feeder, the SUNBURY Automatic Unloader

Will load or unload a 50-ton car in 90 minutes!



The SUNBURY Automatic Unloader

And one man can handle it. The first cost is reasonable and its return from the standpoint of its being able to substantially increase your profits makes it a very profitable investment.

Its automatic feature is important and will commend it to you. It is simple in construction, strongly built and economical in operation.

We will be pleased to send you an illustrated descriptive circular.

THE SUNBURY MANUFACTURING CO.

SUNBURY, OHIO

The SCOOP CONVEYOR
Does the Work of from 6 to 12 Men and Keeps Equipment Moving
Saves Car Demurrage
PORTABLE MACHINERY CO. PASSAIC, N.J.
OVER 2000 USERS

HAISS

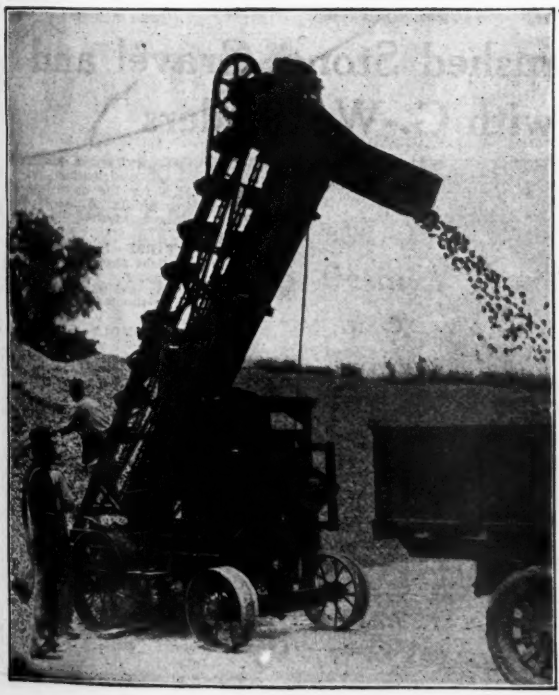
This name, linked with words "wagon loader," brings to your mind the strongest, the most powerful, and the most efficient labor-saving mechanism — namely, the patented "Path Digging" Wagon Loader, that the sand, gravel, stone, coal and chemical industries have so far been able to obtain for the quickest and cheapest truck loading from ground storage piles or sand banks, and for the smallest initial investment.

These Propellers Mean Everything

to the Haiss Self-Feeding, Self-Propelling and Self-Crowding "Path Digging" Wagon Loader. They make every bucket take a full load; they make a clean "path" for the wheels; and they discharge all your shovel laborers. Capacity and Cost = 1 cu. yd. in 1 minute, for 1c worth of power, with 1 man. Write for Booklet 1119.

THE GEORGE HAISS MFG. CO.

142nd St. and Rider Ave. New York City



ATLAS
Self-Propelling
LOADERS

Loading the Atlas Way, spells economy and efficiency in handling sand, crushed stone or gravel.

Let an Atlas Loader be one of the means to help solve your labor problems. Loaders built for handling coal and other loose material.

Write us what your wants are and let us tell you how you can handle your material cheaper and better. Write for

Atlas Loader Catalogue.

Atlas Engineering Co

Home Office and Factory
3009-21 Lisbon Ave.
Milwaukee, Wis.

Insley Cars for Quarry Work

Strength of Construction — Insley cars are designed and constructed to stand up under severe operating service.

Cost of Operation — Insley cars all have roller bearings of an improved type and can be handled with minimum power.

Maintenance — Insley cars will reduce your maintenance costs to a minimum.

Let us figure upon your car requirements.

INSLEY

INSLEY MANUFACTURING CO.

Engineers INDIANAPOLIS, INDIANA Manufacturers

Handling Crushed Stone, Gravel and Sand with G.-W. Loaders

THERE are a number of contributing reasons for the quick-loading ability of the G-W Wagon Loader.

FIRST—The frame is of light steel, though exceedingly strong and rigid, making it easy to move the machine about.

SECONDLY—The collapsible feature permits the machine to be lowered to clear obstructions such as are found in many yards. To raise or lower the machine, less than one minute is required.

THIRDLY—All mechanism is a model of simplicity, making for easy and rapid handling, and minimum upkeep.

By all means get our "Bulletin 40." It's full of data and pictures showing what G-W Wagon Loaders can do in the way of handling crushed rock, gravel, sand, etc.

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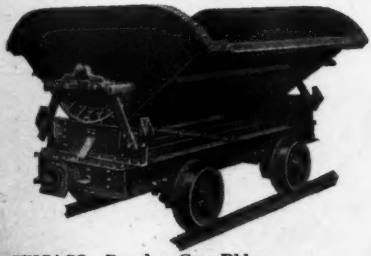

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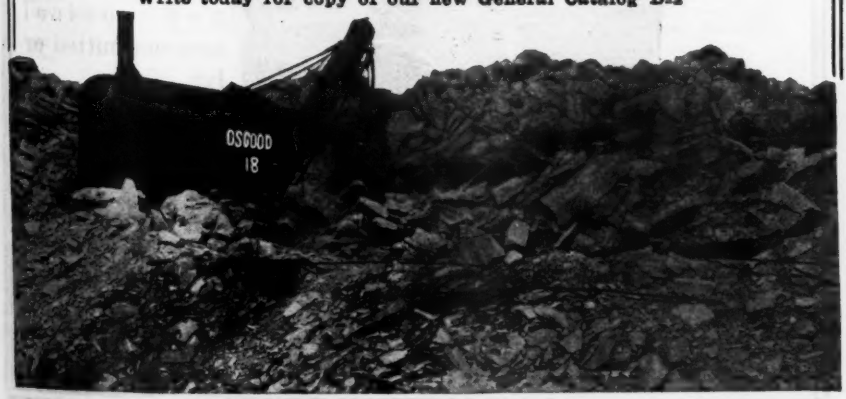

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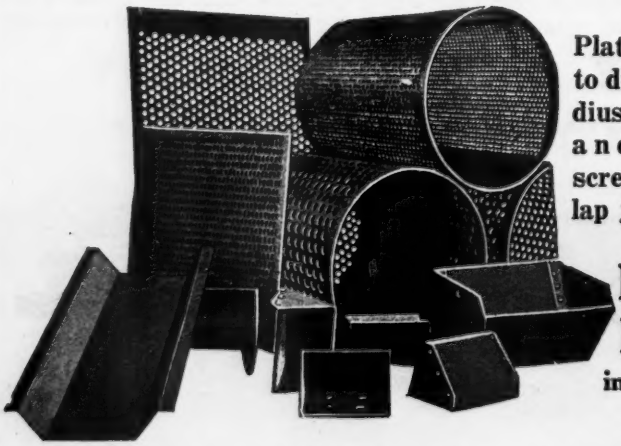
FOR STONE, SAND, GRAVEL, ETC.



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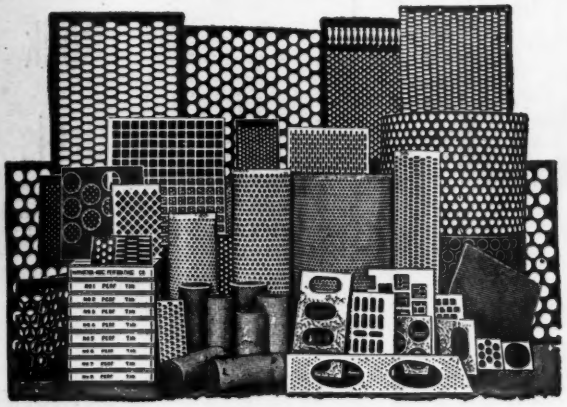

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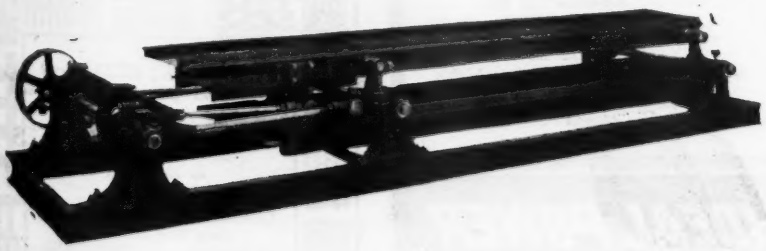

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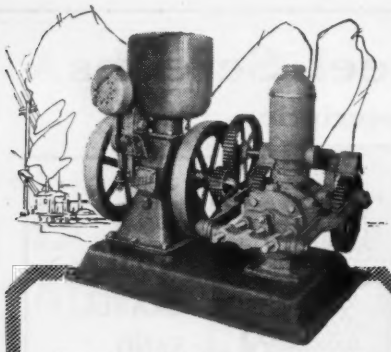

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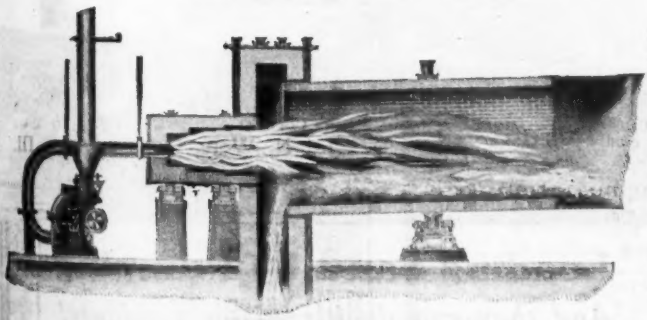

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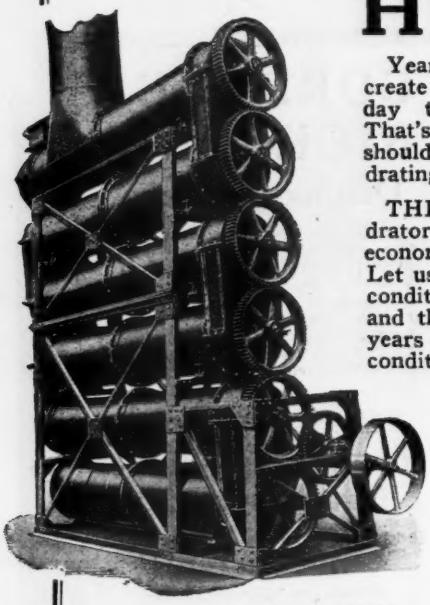

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THE KRITZER Continuous Lime Hydrator is efficient in production and economical in operation and maintenance. Let us investigate exhaustively the local conditions peculiar to your proposition, and then apply our experience of many years and design a plant to meet those conditions.

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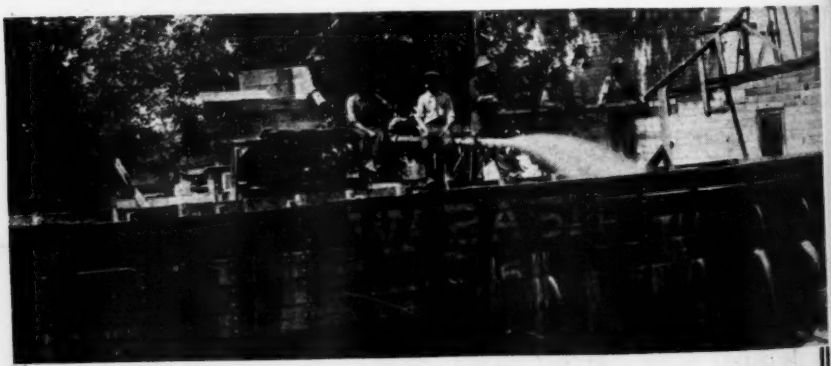

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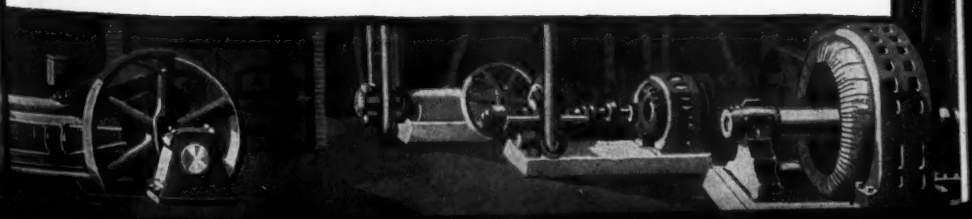

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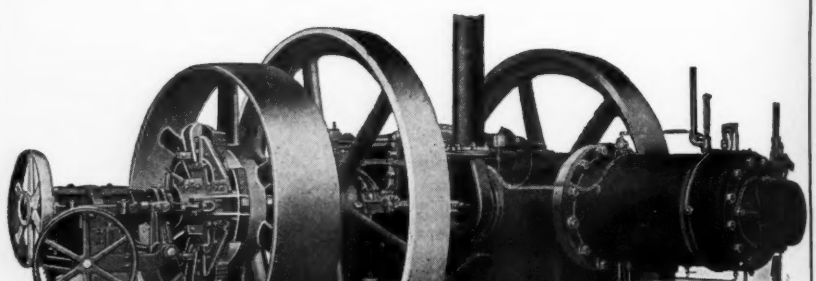

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Power for Plants

By DANIEL J. HAUER

Neither stone quarries nor sand and gravel pits can be operated without the use of mechanical power plants. Of these we have three or four types; steam, compressed air, electricity, and gasoline or oil.

At one time, a decade or two ago, the decision in selecting power was not difficult to reach, for in nearly all cases there had to be an installation of steam, so it was boiler and engines, shafting and pulleys. In some cases this is still true, but in a very large number of examples choice of other power can be made. Each has advantages and disadvantages.

In the early days everything in a quarry was operated by steam. Even when power drills began to take place of hand drills, steam was the power used for them. Then, for drilling, compressed air was found to be superior to steam and compressor plants were installed. The compressors, though, were run by steam. The next step was the use of air for other machines than drills, such as hoists, pumps, etc. The use of air promised a great future; but it has been curtailed, due to the fact that other power has been developed and central power plants with these are not a necessity as it is with compressed air.

For quarries and gravel sand pits central power plants are seldom the most economical except when only a few machines are operated within close confines. Separate units have been found better, and for such electricity, when it is available, is considered excellent for all stationary machines. For individual units gasoline and oil motors are also much used. These are especially adapted for portable machines. Oil when used for burning under boilers reduces the proposition to steam. The change from one kind of power to another has been gradual and can be best explained by some actual examples.

In a large pit quarry it was necessary to keep three large centrifugal pumps going day and night to keep the pit unwatered. The plant, an old one, was operated by steam. On account of the night pumping one of the boilers had to be kept going 14 extra hours per day. This entailed the keeping on of a night fireman. After years of this kind of operation electric motors were installed and the pumps were kept at work day and night without the need of a night fireman, the boiler fires being banked. This continued for a few years when the hoists operating the incline were electrified. Later the crusher plant was rebuilt and motors installed to operate the crusher, screens and elevators. Thus in this case the change came gradually over a number of years, the operator realizing at each successive step that he was saving power and labor.

It is this type of power plant that allows one unit to be worked without any consideration of the rest of the plant and with the least consumption of power. Thus a compressor plant operated by electricity can be kept running to furnish the power for drilling in the quarry, for running the forges and drill sharpening machines in the blacksmith shop, while the rest of the quarry plant is shut down.

In the next issue of Pit and Quarry a new Pennsylvania plant will be described. This plant is operated by electricity. The stone is stored in bins on the mountain side and from these bins is carried to the grading screens 500 feet away, located over other storage bins over the railroad track. If all the storage bins are filled and cars cannot be obtained for shipping, the quarry must be shut down, unless it is decided to continue drilling. If a few cars are obtained, with the individual electrical units only two motors are needed to transport and screen and grade the stone, about 120 H. P. being used, out of the 1000 H. P. needed to operate the entire plant. If this car loading lasts only an hour or two per day over a period of four or five days, it can be seen what a great saving in power is effected over starting up fires under boilers for such a small amount of work.

This quarry operated its well driller by a gasoline engine, it being portable and frequently moved. Its dinkeys were likewise equipped with gasoline motors while the stripper and shovel were operated by steam. All of these, moving frequently, were thus not bothered with wires and the chance of injuring workmen with electricity was eliminated.

Not every quarry or gravel pit is so located that electric current can be purchased, and to build a steam plant to manufacture electricity is seldom economical in a small space. But it

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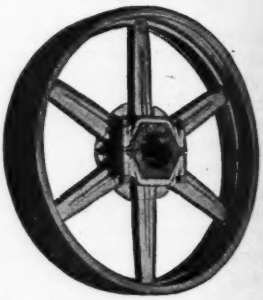

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One of the largest cement mills in the country reports an average service of 2,279 hours from Adamite Kent Mill rolls with chilled faces, as against an average of 750 hours for chilled iron rolls on the same work.

Adamite service —*three* times that of cast iron —and this is just one example!

Where production demands the utmost in service and where quality of work is a necessity, there use Adamite and get —SERVICE.

PITTSBURGH IRON & STEEL FOUNDRIES CO.

Executive Offices, Pittsburgh, Pa. Foundries, Midland, Pa.

United Engineering & Foundry Co., Pittsburgh, Sole Licensees.

is sometimes possible to dam up a swift running stream and at a small cost produce a cheap current for years. Only recently the writer has recommended this course for a new quarry proposition. This procedure will generally pay over purchasing current from a power company.

Just as electric motors are used for individual machines, it is possible to use gasoline engines up to certain sizes. This is especially true of sand and gravel pits. Thus pumps are operated by gasoline, also conveyors and diggers. Screens over movable bins and even washers are run by gasoline. Crushers too can be operated by the same power.

For sand and gravel production electricity and gasoline can both be used. Large plants located away from power centers are still operated by steam, but coal supplies have become very uncertain and the price being high, these have had a decided tendency to make operators look for other kinds of power. The high price of gasoline is likewise causing operators to look to the oil engine, some of which are operated by kerosene, others by distillates and some even by crude oil.

There can be no set rule made for deciding what power to use. Local conditions and the size of the machines to be used as well as the power available must be the governing factors.

It would be unbusinesslike to condemn the use of any particular power. Each has its particular function for certain kinds of machines and work.

Owing to the constantly growing demand for cement and crushed rock to supply the building needs in Oklahoma, the Oklahoma Geological Survey has begun a special investigation of the cement and limestone resources of the state. This is the statement made by C. W. Shannon, director of the O. G. S. A circular showing the location of limestone deposits and covering general features of the state in connection with this natural product, is being prepared by the survey.

The Material Handling Machinery Manufacturers' Association, New York City, have removed from No. 35 West 39th street to 114 West 40th street. Mrs. Zenas W. Carter is secretary-manager of this organization.

Lime Kilns Should Have Good Grates

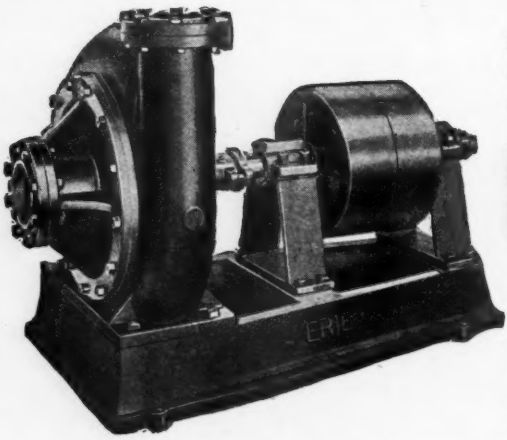
A DECADE or two ago most lime kilns were mere holes in the side of a hill, lined with stone. A fire was started in them by some means or other and when hot enough the limestone was dumped in and the burning of the lime continued until the process was completed. If this took some hours longer, it was not considered of any great importance.

Progress along the line of kiln construction has been rapid, and today kilns are no longer built in holes but are actually designed, then constructed. This has proven economical as to a superior grade of lime, quickness of operation and fuel consumed.

In spite of this, many lime burners pay little attention to the grates used in their modern kilns. Naturally both the economy and efficiency of any fire must be based upon the design of the fire-box and the grate. Keeping these facts in mind, it is readily seen that to use any kind of an ordinary grate is a great mistake. The best type of a self-cleaning grate should be the only one used.

With such a grate, two results will be obtained: first, less fuel will be used; and second, the lime will be produced quicker. This means a product at less cost, hence great profits can and will be made.

The new crusher plant of the Baker Stone Company, at Bluefield, W Va., has begun operation. Its daily capacity is 300 tons of crushed stone. The quarry covers an area of three acres of high-grade limestone, which analysis has shown to contain about 95 per cent lime. The new plant is so productive that Mr. R. F. Baker, president of the company, stated it will be unnecessary, for the time being, to operate their other plant in South Bluefield. Mr. Baker also stated that the new plant will enable the company to take up the production of pulverized lime.



For handling sand, gravel, and other solids in suspension at a minimum cost, use

Erie Sand-Gravel Dredging Pumps

Small sizes as well as largest ones are designed to give maximum output and greatest wear for a given weight.

Tell us your conditions, giving total vertical lift with length of pipe line, and ask for Bulletin P-33

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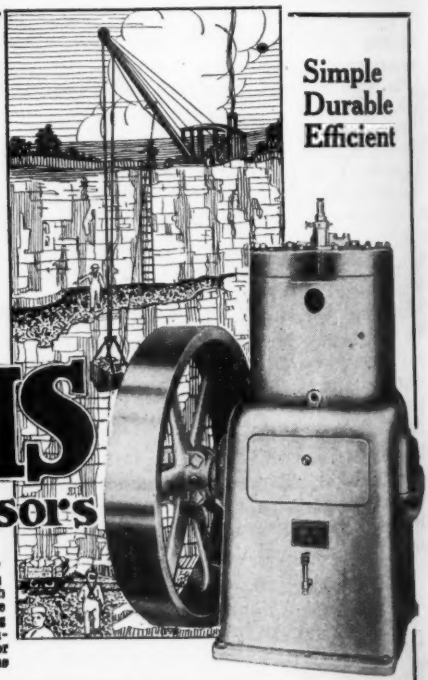
Curtis Air Compressors require less power to operate, because of correct design, good materials used, conscientious construction, and the embodiment of our long experience in manufacturing machinery of this character.



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Are especially adapted to Pit and Quarry uses. Have self-regulating splash system for cylinder oiling. Can be furnished with automatic unloader if desired. 80% more cooling surface than any double-acting compressors of same capacity. Fully enclosed—dirt and dust proof. Write for illustrated bulletin describing our various models.

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Name of Rope Company Changed

The corporate name of the Macomber & Whyte Rope Company, Kenosha, Wis., has been changed to Macwhyte Company—effective June 1st.

No change in ownership, management, or policy of the company is involved.

The products of the Macwhyte Company have for several years been known and advertised under the trade name, "Macwhyte." The change therefore brings the name of the company into line with the name of the products.

Furthermore, Macwhyte Company manufactures not only wire rope, but also streamline wire for airplanes, mine car hitchings, safety detaching hooks for coal mines—and the new name more logically covers these products than the old one.

Mr. George S. Whyte continues as president and general manager, Mr. Jessel S. Whyte as secretary, and Mr. E. W. Reitzel as treasurer.

New Sales Manager

The Gandy Belting Company announces the appointment of Mr. Fielder I. Schillinberg, Jr., to the position of general sales manager, succeeding Mr. Chas. H. Dankmeyer, resigned.

The recently opened Chicago branch at 549 West Washington Street will be under the charge of Mr. H. Milton Michel, who comes from the New York branch. Mr. Robert Crane will be in charge of the New York branch at 36 Warren Street.

Elected Vice-President

The American Manganese Steel Company announces that Mr. Walter Brinton, who was manager at their New Castle, Del., plant for several years, has been elected vice-president of this company.

Offices Moved

On June 1st the Easton Car & Construction Company removed their General Offices from 30 Church Street to larger quarters in 50 Church Street.

Recent Patents

The following patents of interest to readers of this journal recently were issued from the United States Patent Office. Copies thereof may be obtained from R. E. Burnham, patent and trade-mark attorney, Continental Trust Building, Washington, D. C., at the rate of 20c each. State number of patent and name of inventor when ordering.

1,340,247. Excavating - machine. Oluf G. Petersen, Somerset, Ky.

1,340,345. Concrete-mixer loader. Virgil M. Price, Alameda, Cal.

1,340,385. Renewable cutting-tooth point. Warren L. Edmondson, Washington, D. C.

1,340,420. Spudding-shoe. William L. Settle, Memphis, Tenn.

1,340,445. Combination excavator, crusher, and dredger. William A. Huelsdonk, San Francisco, Cal.

1,340,498. Power-shovel. Charles A. Peatt, Chicago, Ill., assignor to Goodman Mfg. Co., same place.

1,340,505. Rock-drill. William A. Smith, Denver, Colo., assignor to Denver Rock Drill Mfg. Co., same place.

1,340,731. Mining and loading machine. Edward C. Morgan, Chicago, Ill.

1,340,880. Cement-mixer. Peter O. Egeland, Akeley, Minn.

1,340,424. Method and apparatus for constructing concrete piles. Shepard M. Cotten, Phoenix, Ariz.

1,342,739. Excavating-dipper. Morton E. Pugh, Chicago, Ill.

1,342,895. Excavator. Edward D. Callen, Greenville, Miss.

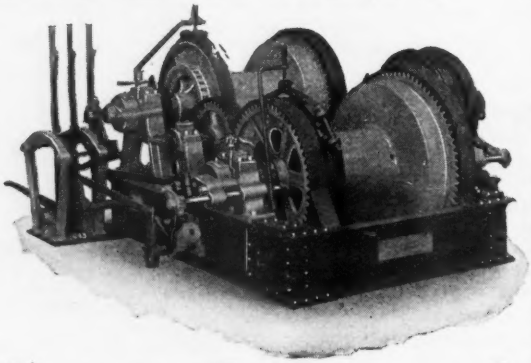
1,342,990. Apparatus for screening and washing gravel. Raymond W. Dull, La Grange, Ill.

1,342,996. Clam-shell bucket. Harvey Le Gear, Chicago, Ill

Oscar Swineford, 617 Mutual Building, Richmond, Va., is organizing a company to operate sand and gravel properties in this section. Considerable machinery and equipment will be installed for operation, including washing machinery, screening equipment, etc.

The West Line Rock Co., West Line Mo., has been incorporated in Delaware with capital of $150,000, to operate rock quarries in this section. The incorporators are J. W. Weisser, West Line; and E. E. and O. E. Hairgrove, Kansas City, Mo.

LIDGERWOOD HOISTS



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The Great Ship "SEEANDBEE" — "CITY OF ERIE" — "CITY OF BUFFALO"

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Leave CLEVELAND	9:00 P. M.	EASTERN STANDARD TIME	Leave BUFFALO	9:00 P. M.
Arrive BUFFALO	7:30 A. M.		Arrive CLEVELAND	7:30 A. M.

Connections at Buffalo for Niagara Falls and all Eastern and Canadian points. Railroad tickets reading between Cleveland and Buffalo are good for transportation on our steamers. Ask your ticket agent or American Express Agent for tickets via C. & B. Line. New Tourist Automobile Rate—$10.00 Round Trip, with 2 days return limit, for cars not exceeding 127 in. wheelbase.

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floats on the water level removes all impurities as they rise to the surface during generation of steam. Prevents scale formation and the accumulation of mud which are so detrimental to the life of the boiler. Ends blow-off valve trouble. Reduces fuel bills. Works automatically. Costs nothing to operate.

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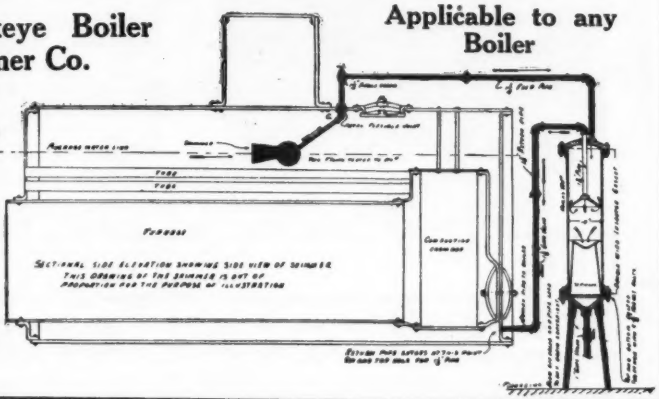
Applicable to any Boiler



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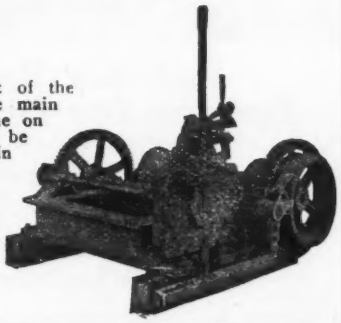

Dake Engine Co., Grand Haven, Mich.

New York: H. L. Drullard, 30 Church St.
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741 Monadnock Block

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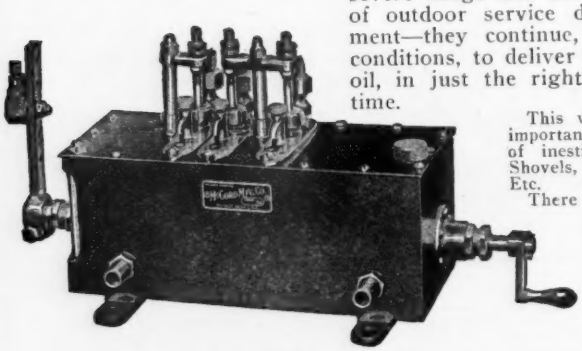

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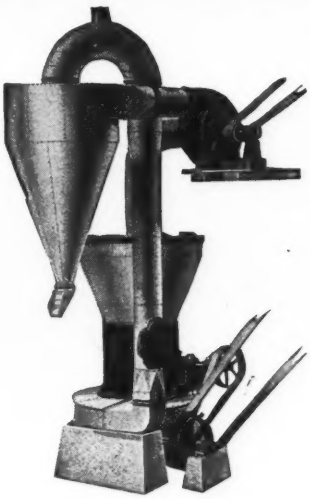

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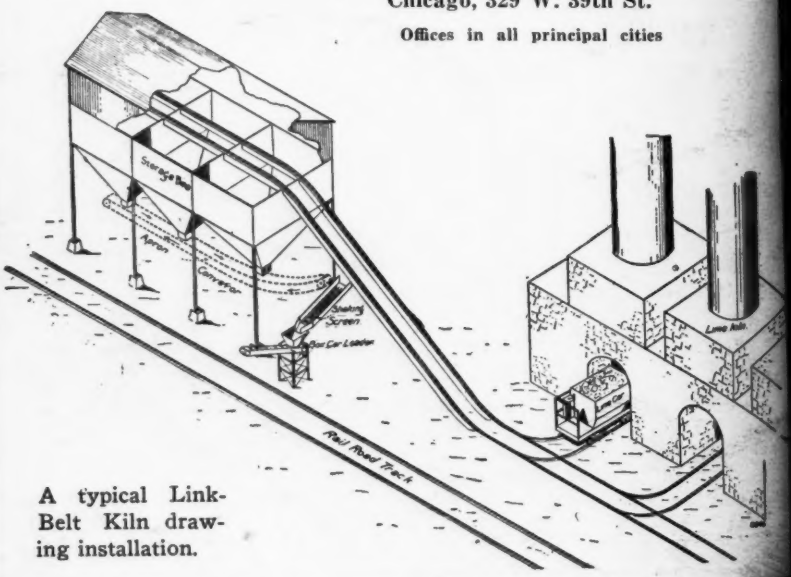

A typical Link-Belt Kiln drawing installation.